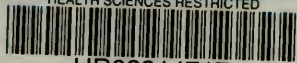


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ELEVENTH BIENNIAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA,

FOR THE FISCAL YEARS FROM JUNE 30, 1888, TO JUNE 30, 1890.



SACRAMENTO:

STATE OFFICE, : : : : : J. D. YOUNG, SUPT. STATE PRINTING.

1890.

MEMBERS OF THE CALIFORNIA STATE BOARD OF HEALTH.

President.

HENRY S. ORME, M.D. Los Angeles.

Secretary.

GERRARD G. TYRRELL, M.D. Sacramento.

W. R. CLUNESS, M.D. Sacramento.

R. BEVERLY COLE, M.D. San Francisco.

JAMES SIMPSON, M.D. San Francisco.

J. M. BRICELAND, M.D. Shasta.

C. A. RUGGLES, M.D. Stockton.

STANDING COMMITTEES OF THE STATE BOARD OF HEALTH.

1. *On the Salubrity of Public Institutions, Schools, Hospitals, Prisons, Factories, etc.*

DOCTORS COLE, ORME, AND SIMPSON.

2. *On Statistics relating to Life and Health, Modes of Employment and of Living, and the Comparative Healthfulness of different localities.*

DOCTORS CLUNESS, BRICELAND, AND TYRRELL.

3. *On Intoxicating Liquors, Inebriate Asylums, Pathological Influence of Alcohol, etc.*

DOCTORS SIMPSON, COLE, AND RUGGLES.

4. *On Influence of Irrigation, Tree Planting, etc.*

DOCTORS RUGGLES, ORME, AND CLUNESS.

On Legislative Business.

DOCTORS BRICELAND, ORME, AND TYRRELL.

On these Committees the Secretary of the Board is ex officio a member.

REPORT OF THE BOARD.

To his Excellency R. W. WATERMAN, Governor of the State of California:

In accordance with law, we herewith present the eleventh Biennial Report of the State Board of Health, and are pleased to congratulate the people of our Commonwealth upon the general good health which has prevailed during the past two years. California has experienced the common lot in a visitation of epidemic influenza in the early part of the present year, which led to considerable increase of mortality for several weeks, through pulmonary complications. An alarm of smallpox in May, 1890, in the Rio Grande region of New Mexico, justified us in sending out an Inspector, authorized to take the necessary measures to exclude the disease from the State. His report will be found in these pages, to show that the danger is not threatening during the warm season, but is liable to become imminent during the coming winter unless vigorous measures be taken meanwhile, through aid of the Federal Government.

We are gratified to know that the Government Quarantine Station, on Angel Island, Bay of San Francisco, is nearing completion, and is to be equipped with the most ample and improved appliances known in sanitation, whereby our State will be fully protected from foreign pestilence with the least possible interference with maritime traffic. This has been a great desideratum, and its establishment will give us security against cholera in any invasion from lands westward.

In view of the continued presence of leprosy in our State, the increasing number of white persons who become infected, and the absence of special hospitals for their isolation in any county, we beg to suggest the propriety, or perhaps necessity, of a State institution, to which they might be sent from all quarters within our borders. Each county might be required to contribute the necessary amount to defray the expenses of those sent out from its own territory, so that the State Treasury might be burdened only with the moderate cost of a suitable leper hospital, with accommodations for about twenty-five persons.

The appropriation of \$10,000, in 1887, for the use of the Board in excluding contagious disease from the State, has so far been more than sufficient, as only \$4,026 85 have been expended. We would recommend the further appropriation of \$10,000, subject to the same conditions as before, to meet any emergency that may arise.

With reference to other sanitary legislation, we are gratified to state that several important measures were enacted during the session of 1889. Section 3062, Penal Code, has been so amended that every unincorporated city or town, of five hundred or more inhabitants, must have a Health Officer; and a new section, 3064, provides for his compensation, and for his appointment by the State Board of Health, in case the county authorities neglect their duty in the case.

A new section, 3084, requires burial permits throughout the State, preceded and based upon a certificate of death from a physician, Coroner, or two reputable citizens.

Section 377, Penal Code, has been amended so as to provide penalties for violation of the law regulating burial permits, death certificates, and registration of deaths.

A new section, 400, makes it a misdemeanor to bring any diseased domestic animals into the State.

A law was enacted, requiring children throughout the State to be successfully vaccinated before admission to the public schools; and it is made the duty of the Trustees, or local School Boards, to provide for their vaccination. This law should be strictly enforced.

Another Act provides for the sanitary condition of factories, workshops, and mercantile establishments. Its execution is placed in the hands of the Commissioner of the Bureau of Labor Statistics, but he is not furnished with any additional officers or means to make the necessary inspections. The supervision of such matters properly belongs to the Health Department of cities and towns, and the law should be so amended as to provide for this.

A bill providing for a State Sanitary Inspector, to be chosen by the State Board of Health, and act under its orders, passed both the Senate and the Assembly just before the close of the session, but failed to obtain the Governor's approval. For several years the Board has felt the need of such an officer, to enable it to execute the functions imposed upon it, especially those enumerated in Section 2979 of the Political Code. The law forbids any compensation to the members, with the exception of the Secretary, whose province is mainly confined to the State capital; and the duties there defined will occupy the whole time of an expert sanitarian in visiting all parts of the State, inspecting public institutions, instituting and superintending a sanitary survey of the State, stimulating local authorities to *faithful execution of the laws* and to *hygienic improvements*, and in the *exclusion of contagious disease from the State*, whenever danger threatens its borders. Through such an agency the State Board can carry home its influence in full force to all public institutions subject to its supervision, to all local Boards of Health, and to the remotest communities. The State Board, therefore, regards its duty plain, to urge anew the necessary legislation for this object; and it confidently expects the Legislature and the Governor alike to favor a measure so promising of important benefits to the people of the State.

We would also recommend to your Excellency that the law organizing the State Board of Health be so amended as to provide a per diem of ten dollars for each member while engaged in the actual duties of the Board, as a slight compensation for the loss of time necessarily given in the service of the State.

Respectfully submitted.

H. S. ORME, M.D., President.
G. G. TYRRELL, M.D., Secretary.
W. R. CLUNESS, M.D.
JAMES SIMPSON, M.D.
R. BEVERLY COLE, M.D.
CHAS. A. RUGGLES, M.D.
J. M. BRICELAND, M.D.

ABSTRACT OF PROCEEDINGS

OF THE

QUARTERLY MEETINGS HELD DURING THE FORTIETH AND FORTY-FIRST FISCAL YEARS, ENDING JUNE 30, 1890.

SPECIAL MEETING, JULY 26, 1888.

A special meeting of the State Board of Health, convened at the request of his Excellency Governor Waterman, was held in the office of the Governor on Thursday, July 26, 1888, at 2 o'clock P. M. The Governor stated that the object of the meeting was for consultation with the Board as to their duty as an advisory Board to the State. The Governor stated that he believed that many of the institutions drawing aid from the State were in a bad sanitary condition; that the inmates were not receiving the aid to which, as wards of the State, they were entitled, and that he wished the State Board of Health to take the matter in hand, and to investigate the sanitary condition and administration of all public institutions drawing aid from the State and report their condition to him. He desired that every one doing business for the State should do it earnestly and fairly, and if those people in these different institutions were being wronged by their officers, or their sanitary welfare neglected, he desired the wrong righted, and he thought the State Board of Health the proper body to make an impartial report.

Dr. R. B. Cole desired to know of the Governor if it was his intention to have all the State institutions investigated, as it would take considerable time, and he must recollect that the State Board of Health received no compensation for their loss of time.

The Governor replied that the Board could choose its own time, but he certainly required all institutions drawing money from the State investigated, and all abuses, if any, corrected.

Dr. Orme said that although the State Board received no compensation, all its members were willing to do their whole duty in the premises, and would cheerfully aid the Governor in his efforts to maintain the healthful condition of all such institutions, and keep their administration free from injurious consequences likely to arise from unhygienic measures.

The Governor ordered the Secretary to furnish the Board with a list of all institutions drawing money from the State, both schools, asylums, hospitals, and reformatories, and requested the members of the Board to make some arrangement amongst themselves so that they might form sub-committees and visit these institutions. He mentioned some particularly which he wished reported upon early, and authorized the Board to employ a clerk if necessary, to note their proceedings during their official visits.

Dr. Simpson thought that he and Dr. Cole could report on the State institutions in and about San Francisco and Napa; Dr. Orme and Dr.

Ruggles could visit Stockton, and the other members could take the remaining places most convenient to them as they pleased.

After some further consultation on sanitary matters, and the earnest promise of the Governor to aid the Board in all matters appertaining to the health of the State, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, July 26, 1888, at the usual hour.

Present—Dr. Orme, President; Drs. Tyrrell, Cluness, Briceland, Ruggles, Cole, and Simpson.

The minutes of the last meeting having been read and approved, Dr. Cole moved the following resolution:

Resolved, That in recognition of the efficient services rendered this State by our representatives in Congress, and Surgeon J. B. Hamilton, Surgeon General United States Marine Hospital Service, in securing the passage of our quarantine bill, this Board wishes to tender its sincerest thanks; and further be it

Resolved, That a copy of these resolutions, engrossed and signed by the President and Secretary of this Board, with official seal attached, be sent to each one of our representatives and Surgeon-General Hamilton.

Which was unanimously carried.

At the last meeting of our Board in San Francisco, it was agreed that a committee of two be appointed from this Board and two from the Board of Health in San Francisco, to consult together and agree upon what sanitary measures were needed to be presented at the next Legislature. Dr. Orme, in pursuance of that agreement, desired to appoint Dr. R. Beverly Cole and Dr. James Simpson, as our representatives in that Convention, and instructed the Secretary to notify the San Francisco Board of Health that such members, being residents of San Francisco, had been appointed in accordance with the resolution adopted April 16, 1888.

Dr. Orme presented his report as our delegate to the conference of State Boards of Health, which being very satisfactory to the members and confirmed their belief in the importance of having our Board represented, it was ordered that the report be published in the next Biennial Report of the State Board of Health.

The San Francisco City Board of Health having informed this Board of the occurrence of cholera in Hong Kong and its action in endeavoring to obtain authentic information from Surgeon-General Hamilton, who replied that no recent report had been received from Hong Kong, the following cable dispatch was transmitted soon after to this Board by Secretary Cyril Williams of the City Board of Health, San Francisco: "Cholera epidemic terminated July 9, 1888." However, the City Board of Health determined that all vessels arriving from Hong Kong with clean bills of health will be detained in quarantine three days, and passengers and effects fumigated.

On motion, the communications were received, placed on file, and the Secretary requested to continue in communication with the San Francisco Board, and request its Secretary to keep us informed of the progress of the disease, and the action taken by their Board, and that this Board

will at all times be ready to coöperate with their Board in preventing the invasion of this State by cholera.

Dr. James Simpson then introduced the following resolution:

Resolved, That this Board indorse and earnestly advise the passage of the bill now before Congress, known as House Bill No. 1,526, to establish a Bureau of Health, and that the Secretary is hereby instructed to send a copy of this resolution to our Senators and Representatives in Congress, with the request that they give it their support; and, further, that a copy of this resolution be forwarded to Hon. Robert T. Davis, of Massachusetts, the introducer of the bill.

Which was carried.

In view of the conference held to-day with Governor Waterman, Dr. R. Beverly Cole moved that the request of the Governor be now acted upon by the appointment of committees to report upon the sanitary condition and administration of the following particularly named institutions receiving State support:

Insane Asylum, Napa; San Francisco City and County Almshouse; Ladies' Relief Society, Oakland; Ladies' Relief Society, San Francisco; San Francisco Lying-in Hospital and Foundling Asylum; San Francisco Catholic and St. Joseph's Orphan Asylums; Sick Old Ladies' Home; San Francisco Female Hospital. Drs. Cole and Simpson were appointed a committee to investigate these institutions.

Stockton Insane Asylum; San Joaquin County Hospital; Los Angeles Orphans' Home; Los Angeles Orphan Asylum, Los Angeles. Drs. Orme and Ruggles were appointed as the committee to visit these institutions.

The Sacramento Orphan Asylum; St. Joseph's Orphan Asylum, Sacramento. Drs. Cluness and Tyrrell were appointed a committee to visit these places.

The Secretary was requested to furnish each member with a complete list of all institutions receiving aid from the State.

Dr. Simpson moved that the Secretary of this Board send the committees of this Board of Health copies of the law, section and article (repeating it), instructing them to examine into the sanitary condition and administration of the named institutions, signed by the President and attested by the Secretary, which was carried.

The Secretary then read a communication from the Clerk of Solano County in reference to the Selby Smelting Works, and asking the Board to have it, as a nuisance and prejudicial to health, removed or restrained from continuing its work.

On motion of Doctor Simpson, it was resolved that this Board, being merely an advisory body, had no power to take action in the matter complained of.

Dr. Orme read his report upon smallpox in Southern California for 1888, which was ordered published in the next Biennial Report of the Board.

Dr. Orme introduced the subject of the use of salt water for sprinkling purposes in cities, whether it was prejudicial to health or innocuous.

Dr. Simpson thought the subject one which required some deliberation, as sanitarians are not agreed upon its effects, and moved it be considered at some subsequent meeting, which was carried.

The question of cholera approaching our coast was next considered, and the opinion prevailed that we ought to make every preparation necessary for its reception, the probability of its coming here this summer being very great, and we cannot warn the people too soon to be on

their guard, and by perfect cleanliness to lessen the probabilities of its lodgment on the coast.

The question, What shall we do with our lepers, engaged the attention of the members in an animated discussion, in which all the members joined. The opinion generally concurred in was, that they should be disposed of as other sufferers from contagious disease, and isolated in some way during the period of their natural lives.

It was requested that any member of the Board who could find an authentic description of the cholera epidemic which raged along our coast in 1849-50-51, do so and present it to this Board.

There being no further business before the Board, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

SPECIAL MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco, September 29, 1888.

Present—Dr. Orme, President; Dr. Tyrrell, Dr. Simpson, Dr. Brice-land, Dr. Cluness, Dr. Ruggles. Dr. Cole was absent. Dr. Sawtelle, Dr. Barger, Dr. Herrick, City Board of Health; and Dr. Huse, Railroad Hospital service, were present by invitation.

The Secretary read a communication from the Governor, calling attention to the necessity of the Board's action in regard to yellow fever, as follows:

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
September 24, 1888. }

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento:

DEAR SIR: In view of the fact that yellow fever is epidemic in several of the Southern States, and that its spreading is to be feared, and in order to guard and protect our own people against the invasion of so terrible a scourge, I desire that the State Board of Health shall bring every appliance to bear that may be considered necessary in order that its entrance into this State, either from the south or from the north, may be prevented whenever the power of the Board will permit; see that Inspectors are appointed, who thoroughly understand their duties, and will properly and honestly fulfill them; and should it be necessary to appoint or require the services of Inspectors in localities not within the limits of California, it would be advisable to consult the proper authorities at Washington regarding the matter. I do not desire to hamper you with any suggestions of my own, relying upon the intelligence and good judgment of the Board to carry out my views in the matter, requesting that I may be informed of the progress of events in connection with the subject now under consideration.

Yours truly,

R. W. WATERMAN,
Governor.

The Secretary also read the communication from Mr. J. H. Call, Los Angeles, addressed to Governor Waterman, as follows:

LOS ANGELES, CALIFORNIA, September 25, 1888.

To GOVERNOR WATERMAN:

DEAR SIR: I am informed that shipments of nursery stock are being made from Florida to this State, the particulars of which have been mentioned. We are liable to have yellow fever here any day, unless active and energetic steps are taken.

Yours truly,

J. H. CALL.

The Secretary reported that he had, in reply, telegraphed Mr. J. H. Call to see Dr. Orme and give him the particulars, and he would act at once to quarantine such shipments, which action, on motion, was approved.

Dr. W. R. Cluness thought it possible for the disease to reach California, and also believed that if it ever got into the State there were, at times, certain conditions which would permit its propagation, and thought if the germs were imported they would spread through the warm valleys of the State. He thought that every precaution possible ought to be taken to prevent its entry.

Dr. C. A. Ruggles concurred fully in all that Dr. Cluness had said, and thought the State should lose no time in putting itself on guard against it.

Dr. Simpson fully agreed with Drs. Cluness and Ruggles, that we ought to take action. The money was appropriated for just such purposes, and any blame for neglect of this duty would be severely visited upon the State Board of Health. He was of the opinion that if yellow fever once obtained an entrance into our State it would propagate, and finally be a difficult matter to eradicate it.

Dr. Briceland had lived in Texas, and in Galveston; the climate there is not dissimilar to ours. There it spread rapidly. Our population is constantly increasing and danger becoming greater, and believes with those that have preceded him, that if ever yellow fever gets a foothold in these warm valleys it will spread. He is certainly in favor of taking all the precautions possible, and doing it at once, by appointing Inspectors who are experts in the diagnosis of the disease.

Dr. Sawtelle, U. S. M. H. S., thought the conditions for the propagation of the disease present in California, and if once brought into the State would no doubt spread. He believed prevention possible by supervision of all incoming persons and goods.

Dr. Barger, Health Officer of San Francisco, agreed with all that had been said, and believed that the disease might get into the State through land travel, and that the State Board of Health would be held responsible if such an event occurred.

Dr. Huse thought that a report of the possibility of the entrance of yellow fever into our State would cause us great injury. The railroad company has now withdrawn its tickets via New Orleans. The railroad company hopes nothing will be done that would institute a panic. With a view to making the matter under discussion acceptable to the Board, he would accompany any gentleman appointed by the Board to the southern part of the State, and as far as El Paso, and make a thorough examination of the situation of things along the border, and he promised the coöperation of the railroad company in any action we may desire to take in the premises.

Dr. S. S. Herrick, Assistant Health Officer of San Francisco, thought that in this State we had temperature, susceptible people, sufficient humidity, and all the essentials needed for the propagation of the germs of yellow fever. In New Orleans they had the fever in 1878, although there was a severe frost at the time. He is convinced that if it once obtained a foothold in California it would be impossible to stamp it out; that, in fact, it cannot be stamped out, as, in truth, we know not in what the disease consists.

Dr. Huse remarked that now the railroad line along the Mississippi Valley was open to traffic and no danger was apprehended to travelers thereon.

Dr. Simpson thought it would be prudent to send an Inspector into

El Paso and elsewhere to find out where the disease was, so that we might take such steps to avoid it as seemed best.

The motion of Dr. C. A. Ruggles, that to prevent the possibility of the entrance of infectious diseases into this State, this Board appoint a competent Medical Inspector, at a salary of \$250 a month, and his necessary expenses upon presenting proper vouchers therefor, which was seconded by Dr. Cluness, was unanimously carried.

On motion of Dr. Tyrrell, Dr. S. S. Herrick of San Francisco was nominated as one fully conversant with yellow fever, an authority on inland quarantine, and in every way desirable for the position.

Seconded by Drs. Simpson and Briceland. He was unanimously elected, and requested to enter upon his duties at once.

A telegram was received from Governor Waterman:

SACRAMENTO, CAL., September 29, 1888.

Dr. G. G. TYRRELL, *etc.*:

Report says two carloads of negroes en route from Georgia. Quarantine them somewhere, sure. I will be in Sacramento to-night.

R. W. WATERMAN,
Governor.

The Secretary was instructed to answer the dispatch asking where the negroes were, and by what route they were coming, and the State Board would take action promptly.

On motion of Dr. Simpson, the President and Secretary were requested to call upon Mr. Towne, General Superintendent of S. P. R. R. Co., and ascertain what precautions they are taking regarding freight and passengers from districts infected with yellow fever, to prevent its introduction into the State; which, after some discussion, was carried.

There being no further special business before the Board, on motion, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

THE REGULAR MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, October 13, 1888, at the usual hour.

Present—Dr. Orme, President; Dr. Tyrrell, Dr. Cluness, Dr. Briceland, Dr. Cole, and Dr. C. A. Ruggles.

The minutes of last regular meeting having been read and approved, the minutes of the special meeting were read and approved.

The Secretary called the attention of the Board to a communication from the National Association of General Baggage Agents, embodying the following rules, and asking the action of the Board upon them, as follows:

1. The transportation of bodies of persons dead of smallpox, Asiatic cholera, typhus fever, or yellow fever, is absolutely forbidden.

2. The bodies of those who have died of diphtheria, scarlet fever, typhoid fever, erysipelas, measles, and other contagious, infectious, or communicable diseases, must be wrapped in a sheet thoroughly saturated with a strong solution of chloride of zinc in the proportion of one half pound of zinc to one gallon of water; or a strong solution of not less than 2 per cent strength of bichloride of mercury, and inclosed in an air-tight zinc, copper, or lead-lined coffin, or in an air-tight iron casket, and all inclosed in a strong, tight wooden box. The coffin, or casket, must also be surrounded, in space between coffin and outside box, with sawdust saturated with a solution of chloride of zinc, or chloride of mercury of the same strength as above.

3. In case of contagious, infectious, or communicable disease, the body must not be accompanied by persons who, or articles which have been exposed to the infection of the disease. And in addition to the permit of the Board of Health, agents will require an affidavit from the shipping undertaker stating how the body has been prepared and the kind of coffin or casket used, which must be in conformity with Rule 2, and that the Health Officer of the locality to which the body is consigned has consented to the proposed shipment and has had such timely notice of the hour of its arrival within its jurisdiction as will enable him to supervise its reception.

The bodies of persons dead of diseases that are not contagious, infectious, or communicable, may be received for transportation to local points in same State when incased in a sound coffin, or metallic case, and inclosed in a strong wooden box, securely fastened so that it may be safely handled. But when it is proposed to transport them out of the same State, or to another State, they must be incased in a zinc, copper, or lead-lined coffin, which is air-tight, or in an air-tight iron casket. If any other kind of coffin is used the body must be properly embalmed.

5. Every dead body must be accompanied by a person in charge, who must be provided with a ticket for himself, and also present a full first class ticket marked "corpse," and a permit from the Board of Health giving permission for removal, and showing name of disease, cause of death, and whether of a contagious or infectious nature.

6. The permit of the Board of Health must be issued in duplicate, the original to accompany body to destination; the duplicate will be retained by agent at initial point, and sent to the General Baggage Agent.

7. It is intended no dead body shall be removed which may be the means of spreading disease; therefore, all disinterred bodies dead from any disease or cause will be treated as infectious, and dangerous to public health, and will not be received for transportation unless said removal has been approved by the State Board of Health, and the consent of the Health Officer of the locality to which the body is consigned has first been obtained.

In submitting these rules for your consideration it is not assured that they are now perfect, and we are simply asking your approval of them; on the contrary, we solicit any suggestions or recommendations which, in your opinion, will be to the interests of the public health, and at the same time not unnecessarily burdensome and expensive to the public.

It is a noticeable fact that infectious or communicable diseases follow more quickly the lines of communication, being spread by the movements of the people; and as the railroads are the principal medium of communication among the people, the trunk lines spanning the continent, and bringing to our door the inhabitants of all parts of the country, it is patent to all that local rules, be they ever so stringent, can afford but partial protection, and as the bodies of the dead are transported in the same cars and among the baggage containing the wearing apparel of the passengers, the need of some effective rule which will apply the law in Pennsylvania as in Colorado is the more apparent. Cannot this be accomplished, and may we have your coöperation to that end?

In looking over the above rules, the following inquiries are suggested: Is it policy to have a list of specified dangerous diseases that will not be carried, as in Rule 1, and should this list stand or be extended? Answer—Yes, stand; no extension.

There being a difference of opinion among Health Officers as to danger in transporting bodies dead of certain disease, should we not take the safe side in case of doubt, as in first part of Rule 2? Answer—Yes.

Will the rule of preparing bodies for shipment be effective, or should there also be an injection of fluid into the cavities. Answer—Yes.

What would be the extra expense of thus preparing dead bodies? Answer—We do not know.

What should be the additional expense of ordinary air-tight zinc, copper, lead-lined, or iron caskets, or caskets compared with ordinary coffins, or caskets that are not claimed to be air tight? Answer—The question of expense in this matter is a very serious one, and of course must not be overlooked.

Will this scheme be prohibitory in the case of people of ordinary or limited means? Answer—We do not know.

Is there any standard by which undertakers are graded to ascertain whether competent or not; are they examined by a Board of Examiners before being allowed to practice the art of embalming, as are physicians before practicing their profession? Answer—None in this State.

If not, what assurance have the public of any safety, even though a certain undertaker made oath that he had prepared a body for shipment in accordance to these rules? Answer—None.

Should not each State require undertakers to take out a license, and pass an examination before a competent Board of Examiners, before he is allowed to ship a dead body out of that State? Answer—Yes.

Is there any penalty in your State for making false affidavit, or issuing false certificate, either as to cause of death or as to the preparation of the body for transportation; and, if not, should there not be some legislation which will give the necessary protection? Answer—Yes.

Who, in your opinion, should look after the matter? Answer—Local Board of Health.

Is it not desirable that all permits for the removal of dead bodies be issued by the Boards of Health; and cannot this be done in all cases, even in small towns or country districts? Answer—Yes.

Is it not desirable that a nearly uniform style of removal permits be used, to insure definite and necessary information, to enable persons to transport dead bodies through several States, without danger of being stopped at some intermediate point? Please send samples of permits used in your territory. Answer—Yes.

To enable the committee to prepare their report, we would request that all communications on the subject be sent to the Secretary, at Detroit, Mich., on or before December first.

H. P. DEARING,
J. C. LENIX,
F. A. ZIMMERMAN,
Sub-Committee.

J. E. QUIRK,
Secretary.

On motion, the above answers were given as the conclusions of the Board upon the subject-matter, and the Secretary was instructed to transmit the same to the Secretary of the Baggage Masters Association.

A communication was received from Irving A. Watson calling attention to the publication of a new work upon "Disinfection and Disinfectants," and suggested the purchase of a sufficient number of copies for the use of the members of the Board.

After some discussion, on motion of Dr. Cole, the Secretary was instructed to order eight copies of the same for use of members of the Board, inclusive of one copy for the library of the Board.

The Secretary read the draft of an Act appointing a Sanitary Inspector for the State in general, together with some points in defining his duties. After some discussion as to the propriety of asking the Legislature to add such amendment to our health laws, it was, on motion of Dr. Ruggles, referred to the Committee on Legislation without recommendation.

The Secretary informed the Board that he had telegraphed to Dr. C. A. E. Hertel, of Gonzales, inquiring into the truth of the death of fourteen children from malignant sore throat, the result of eating the meat of diseased cattle, and read Dr. Hertel's reply, informing the Board that the children died in 1884, and not in 1887, as had been stated, and also gave a detailed account of the prevalence of Texas fever and anthrax in Gonzales, and the habit of the Spanish population to salt, pepper, and dry the meat of the dead animals and eat it, but denied they exported it, although one peddler in Gonzales had done so, sending the meat to Salinas. The communication was placed on file for future reference.

Dr. Orme requested the Secretary to read a letter received by Dr. Bowhill, a veterinarian in San Francisco, from a Mr. Wender, of San José, describing the appearance of a diseased cow and calf in Lick market, and also the fatality of Texas fever in Salinas Valley. The letter was read and placed on file.

The report on specimen from Sargents confirmed the diagnosis of splenic apoplexy by Dr. Spencer.

The Secretary also read a letter from J. H. Logan of Santa Cruz describing a case of actinomycosis in a cow in his possession, which was ordered placed on file, having been replied to by the Secretary.

Dr. R. B. Cole, in reference to the presence of Texas fever, anthrax, and actinomycosis, desired to read the Act organizing the State Board of Health, and defining its powers, to ascertain if the Board had any legal authority to act in the premises. He thought we had sufficient evidence of the presence of a disease among cattle which was contagious and infectious, and dangerous to human life, to warrant us in acting

under Section 2979 of the Civil Code, which orders us to take cognizance of the interest of health and life among the citizens generally, "and if we recognize that the public health is now jeopardized, we must act in this relation." Never before in the history of this Board has a question of such vital importance been presented before it for its action. Not only are the lives of our citizens threatened, but it even extends to our progeny, who may have their constitutions ruined by inherited disease. We must attack this disease at its very foundation, but how to get at it effectively he was not prepared to say. Referring to Mr. Mercer's report, who, being a Government agent, and experienced in cattle disease, we cannot doubt the presence of splenic fever on the coast, and although it has not yet been demonstrated that the disease is transmitted to the human family through diseased meat, we know that anthrax has been, likewise actinomycosis. We must take some action to suppress it. He would therefore move that this Board place itself in communication with every local Board of Health in the State, and with Boards of Supervisors or Trustees, and call their attention to the existence of these diseases, and their influence upon public health, and request them to immediately take such steps as in their judgment seem best to determine their existence within their several jurisdictions, and suppress the same. And this Board further suggests that all animals affected by these diseases be killed and cremated; and further, that the surface of the field or range upon which they have fed or traveled over be burned for the purpose of destroying the germs of the disease.

Motion seconded by Drs. Briceland and Ruggles.

Being called upon, Dr. Ruggles hardly knew how to bring what he had to say into line; however, in an interview he had with R. Sargent, to ascertain the facts regarding the southern country, Mr. Sargent was reticent, but referred him to Mr. Miller, a cattle man extensively engaged in the cattle industry. Mr. Miller acknowledged that a man by the name of Breen had lost nine hundred cattle out of one thousand two hundred, but denied that the mortality was due to Texas fever. He said the cattle had been almost starved, and when brought into a rich pasturage had eaten so much that they died of repletion.

Dr. Ruggles believed that the investigation of this disease was going to create quite a disturbance among the cattle men, and was not willing to do anything hastily, but after mature consideration and consultation, we ought to be prepared to do something to check the evil which now so seriously threatens the welfare of our State.

Dr. Orme remarked that he had had a consultation with a gentleman who said that he brought a herd of sixty head from Texas, and after they had been on his pasture a short time, many of them died, but moving them on high ground, the mortality ceased and they became fat and well.

Dr. Briceland was glad to see the discussion assuming a character which would bring out the scientific aspect, as twenty-five years ago little or nothing was known of Texas fever or cattle plague. He remembered, in his experience, that when bringing cattle across the plains from Texas, they would appear to be fat and well; he remarked, however, that when gathering other cattle, the other cattle would get sick and die. This was so constantly observed that the passage of Texas cattle through the Indian nations territory gave rise to much sickness and death among

their herds, as to be the cause of war with the nations. No one then knew what the mysterious sickness was, whether it was something indigenous to Texas, or acquired by travel. We were indeed glad that science had come to the front to explain it, and thought that the Board should take prompt and active measures to suppress it if possible, as it undoubtedly menaced the lives and welfare of our citizens.

Dr. Orme said that when at the conference of State Boards of Health he inquired of several Boards if they took cognizance of diseases among cattle as part of the work of their Board. He found that many of them did, and had laws passed appointing Veterinary Surgeons under control of the Board. Michigan and Minnesota had such laws, and so had several other States, the names of which just then escaped his memory. He thought that if we had our laws so amended as to compel the formation of local Boards, we would be in a much better condition, through a more perfect organization, to combat these diseases, and suppress them wherever they appeared.

Dr. R. B. Cole desired to offer a motion, and said that, in view of the exigencies that had at this time arisen, we believe that, as a Board, we are called upon to take immediate and decisive action; therefore, it is moved, "That a competent veterinary surgeon be appointed, who shall visit the southern portions of this State where the cattle diseases are said to exist; ascertain the facts as to their existence through personal inspection and investigation, and where the disease is discovered that he be instructed to recommend to the Supervisors of each county to have such cattle killed and their carcasses burned, and also to have their place of pasturage destroyed by fire, so far as practicable, to destroy the disease germs." Seconded by Dr. Briceland.

Dr. Ruggles opposed the motion as it now reads, as we had already instructed the Secretary to communicate with the Supervisors to do the very thing we now were going to appoint a veterinary surgeon to do. For his part, he was sure the Supervisors of San Joaquin County would do their duty. They had a competent veterinary surgeon there, who could attend to their county, and did not relish the State officials looking after their local affairs.

Dr. Cole was glad Dr. Ruggles had offered his objections, the force of which he now saw, and would therefore beg leave to amend his motion that it should apply only to those counties which do not take action within sixty days after notification by the Secretary, which was unanimously carried.

The Secretary read a communication from Dr. S. S. Herrick, Medical Inspector, who stated that after diligent investigation, he learned that the negroes reported from Georgia had come from North Carolina by way of Omaha, and had not been near the yellow fever districts. He also learned that no nursery trees had been shipped from Florida, and would not be until February or March, after the frosts; but these shipments would be carefully watched, and if any danger was likely to arise, would be quarantined. He stated that he would visit Guaymas, and personally ascertain if any yellow fever existed in that quarter. He would also visit Tucson, where it was said smallpox was prevailing. At present his headquarters were at Yuma, where he was making preparations to have all passengers inspected.

On motion, the letter was placed on file.

Dr. Ruggles, one of the committee to report the "sanitary condition and administration of institutions drawing State aid," read his report.

Dr. Cole, also on committee, asked further leave to report on the institutions he was to visit, which was granted.

Dr. Tyrrell, with Dr. Cluness, also on a committee, presented their report on institutions visited.

On motion, the various reports were received, and ordered printed in the Biennial Report for service of the Governor.

Dr. Cole moved a special meeting be called by the President whenever he deems it necessary to act upon the resolution appointing a Veterinary Surgeon for the counties which neglect or refuse to act according to the spirit of the resolution. Carried.

The Secretary read a communication from Dr. Hill, offering his services as Inspector at San Pedro, which, on motion, was placed on file.

The report from the American Consul at Guaymas was read. He claimed no sickness there. It was ordered on file.

There being no further business the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, January 5, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. Ruggles, Dr. Cole, Dr. Simpson, Dr. Briceland, and later, Dr. Cluness.

The minutes having been read and approved, the Secretary reported that in accordance with instructions given last meeting, he had drawn up and distributed to the several Supervisors throughout the State the following:

To the ———:

GENTLEMEN: At a meeting of the State Board of Health held in Sacramento, October 13, 1888, it was—

"Resolved, That this Board place itself in communication with every local Board of Health or Board of Supervisors in the State, and call their attention to the existence of contagious and infectious diseases among the cattle in California, and their influence upon public health, and request them to immediately take such steps as in their judgment seem best to determine the existence of such disease within their respective jurisdictions, and suppress the same. And this Board further suggests that all animals affected by these diseases be killed and their carcasses burned; and further, that the surface of the fields or ranges upon which they have fed or traveled, be burned for the purpose of destroying, as far as possible, the germs of disease."

In accordance with the above resolution your attention is hereby called to this matter, and it is hoped that such immediate action will be taken as to promptly arrest the spread of Texas fever, anthrax, actinomycosis, or kindred cattle diseases, and thus prevent the dangers of infection and contagion to which the public is exposed so long as the diseased animal exists. The meat is not fit for human or animal food, and contact with the dead animal may so inoculate any one dressing the carcass that death will rapidly take place, or the system be so impaired by the absorption of the poison that perfect recovery seldom occurs.

H. S. ORME, M.D.,
President.

G. G. TYRRELL, M.D.,
Secretary.

The Secretary read his report on his visit to Merced to examine into an epidemic of smallpox reported there. He also reported a visit made

by Dr. Ruggles to the same town two weeks previous, when he discovered that smallpox existed.

The Secretary then called attention to the claim of the American Public Health Association for \$5, which, on motion, was ordered paid.

Dr. Simpson presented his certificate of reappointment, which was received and placed on file until the reappointment was confirmed by the Senate.

The Secretary then read a communication from the Board of Health of Oakland, regarding cattle disease and the action of the Supervisors ordering all cattle inspected, which, when read, was ordered placed on file.

The Secretary then presented the report of Dr. Thos. Bowhill, upon the cattle disease discovered by him in the southern counties, which was received and placed on file for future reference.

The Secretary read a communication from Dr. Joseph Holt, late of New Orleans, relative to the position of Commissioners of Health in the new Bureau of Health about to be organized by the United States Government, which was received and placed on file for future action.

Dr. James Simpson presented the following report of a joint meeting of the committees appointed by this Board and that of San Francisco, which is herewith appended:

SAN FRANCISCO, January 3, 1889.

At a joint meeting of the legislative committees of the State and City Boards of Health, held at the office of Dr. R. Beverly Cole at 8 P. M., there were present Doctors R. B. Cole and Jas. Simpson, of the State Board, and Perry and Clinton of the City Board, Dr. Cole acting as Chairman. Dr. S. S. Herrick, present by invitation, was requested to act as Secretary.

Dr. Cole first read an article from the January number of the "Pacific Medical and Surgical Journal," upon sanitary legislation, and calling attention to the following subjects as appropriate for consideration, in view of the approaching session of the State Legislature: The more effectual registration of vital statistics; vaccination as a condition of admission to public schools; medical certificates of death and burial permits as prerequisites to interment; notification of cases of contagious or infectious diseases to the health authorities throughout the State; the segregation of lepers; the appointment by the State Board of Health, and provision by the Legislature for the pay, of a State Analyst, a State Sanitary Inspector, and a State Veterinarian; a per diem allowance to the members whilst in active service; the creation and maintenance of local Boards of Health in all the towns and counties of the State.

On motion of Dr. Clinton, it was unanimously agreed to recommend the necessary legislation for the appointment by the State Board of Health of a State Sanitary Inspector and a State Veterinarian, their duties to be defined by the Board, with provision for salary of \$3,000 per annum to the former and \$2,000 to the latter, together with actual and necessary traveling expenses.

Dr. Perry read an extract from the law organizing the State Board of Health of Illinois, showing that that State Board is vested with ample powers in sanitary matters throughout the State. On his motion it was resolved that it is desirable for the California State Board of Health to be empowered to exercise authority in all sanitary matters throughout the State with the exception of quarantine.

On motion of Dr. Simpson, it was resolved that the State Board of Health be authorized to empower local Boards of Health to appoint such sanitary officers as may be deemed necessary, and fix their salaries, said salaries to be paid out of the general fund of each city or county employing such officers.

Dr. Clinton then called attention to a number of desirable changes in the Political Code in order to render more efficient its provision for the sanitary service of the city of San Francisco.

Some discussion was had upon these points, but it was found impracticable at this meeting to bring the subject into shape suitable for precise recommendation. It was agreed that the committee of the City Board of Health should frame a bill to embody their wants, and that the State Board should aid in its passage.

The joint session of the two committees then adjourned.

S. S. HERRICK,
Secretary.

The report was received, and on motion adopted, and the bill accompanying it as modified was ordered presented to the Legislature:

AN ACT

To amend the Political Code by adding two sections to the same, providing for the appointment of a State Sanitary Inspector and a State Veterinarian.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Two new sections are hereby added to the Political Code, to be known as 2984 and 2985.

Section 2984. The State Board of Health must appoint a regular physician in good standing, and of recognized sanitary qualifications, who shall be known as the State Sanitary Inspector, and who must perform such duties as said Board may require. An annual salary of three thousand dollars, together with actual and necessary traveling expenses incurred in the performance of his duties, must be paid to him in the same manner as salaries of State officers are paid.

Section 2985. The State Board of Health must also appoint a suitably qualified man, who shall be known as the State Veterinarian, and who must perform such duties as the Board may require. An annual salary of two thousand dollars, together with actual and necessary traveling expenses incurred in the performance of his duties, must be paid to him in the same manner as salaries of State officers are paid.

SEC. 2. This Act shall be effective from and after its passage.

A communication was read from Dr. G. A. Kober, of Fort Bidwell, asking the indorsement of our Board to a proposition to publish a work upon the topography, botany, climate, and diseases of California, from the standpoint of a sanitarian, and intended for the medical profession.

Dr. R. Beverly Cole moved that it is the sense of this Board that such a work as contemplated by Dr. Kober is very desirable, and will be likely to exert a healthful influence in the interest of this State, and that this Board not only lends its influence, in the matter of furnishing statistical material, but also, as requested by Dr. Kober, will furnish him letters of introduction to our Senators and Representatives in Congress; which, seconded by Dr. Simpson, was, on motion, unanimously carried.

Dr. Orme suggested that the bills already drawn to amend the health laws of the State be presented to the Legislature at as early a day as possible. Carried.

Dr. J. R. Laine presented his commission from the Governor as a member of the Board, and demanded his seat.

Dr. Tyrrell protested that, under the law, there was no vacancy to be filled until Dr. Laine's appointment had the consent of the Senate; accordingly, he was not recognized as a member of the Board, and could not be until such confirmation by the Senate was obtained.

There being no further business, on motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, April 13, 1889.

Present—Dr. H. S. Orme, President; G. G. Tyrrell, Secretary; Dr. J. M. Briceland, Dr. W. R. Cluness, Dr. C. A. Ruggles, members, and Hon. E. W. Maslin by invitation. Letters from Dr. R. Beverly Cole and Dr. Jas. Simpson, explaining the impossibility of their being present, were read and accepted.

The Secretary read a communication from the Board of Health of Georgetown, requesting a visit from the Secretary, to examine and report upon the sanitary condition of Georgetown, and assign some reason, if possible, for the frequency of disease in that town. In compliance with

that request, your Secretary paid an official visit to the town, March 26, 1889, and desires to present to the Board his report.

On motion, the report was read, and ordered spread upon the minutes, as follows:

In company with Mr. C. A. Fitzgerald, Secretary of the Board, and the members of the Board of Health of Georgetown, an examination was made of a certain swamp or slough running in front of the principal street of the town, and parallel with it. This slough or swamp was all the way from twenty to a hundred or more feet wide, covered with rank vegetation. Throughout its length it contained pools of stagnant water, in which algae and decomposing animal and vegetable matter were present. In warm weather the odor from these pools was noted for its great offensiveness. In the center of the slough was a small stream of running water, which was fed by rivulets issuing laterally from the rising ground on either side, and partly from a reservoir at the head of the slough, by seepage through its embankment. Upon one side of this slough was a Chinese settlement. Here were a number of small ponds used by the Chinese for irrigating their vegetable gardens, back of their tenements. Upon visiting these houses the filth observed was simply horrible. In each house was a large earthen jar, into which was conducted by a tin spout all the urine excreted by the inhabitants, whether residents or visitors. As the large jars inspected were half full of stale urine, the collection of some weeks, the odor of decomposition reached the nostrils long before the receptacles were seen. This urine is carefully preserved until the jar was full, when it was emptied into a receiving tank full of human excrement, which had been systematically collected in open boxes placed beneath the seating-plank in each privy. When these in their turn were full, urine and feces were mixed together in sufficient dilution to spray over the growing vegetables.

The stench arising at these times was unbearable, and was continually wafted over the town on the opposite side by the prevailing wind. In one house, or cabin, the operation of hog killing was carried on. This den fairly reeked with blood and offal, which was carefully hoarded in stinking heaps for future use in the gardens. A filthier or more disgusting settlement could hardly be conceived to exist in a civilized country.

Above these Chinese quarters was the reservoir, a large body of storage water, which was kept fresh by a stream of water conveyed to it through the large flume of the water company. Evidently some seepage came through the embankment of this reservoir and found lodgment in the slough at its base. To the left of this reservoir, but outside the town proper, was another large reservoir into which the ditch company's flume emptied, and was received at its opposite side into another flume, which conveyed the water down the mountain side for miners' use. This water was constantly changing and never stagnant.

Pursuing our way down the town, we noticed that the drinking water in use by the population was all obtained through sunken wells, their average depth being about forty feet. In close proximity to these, in nearly every instance, was the privy vault, used for years without cleaning—the custom being that when filled to overflowing another hole was sunk alongside and the privy house moved over it. In one instance the privy was moved over the well, and a new well sunk close by. In the principal hotel, the well was sunk not eighty feet from the privies, which were situated on the side of a hill, just above the well. How this well could possibly escape pollution is beyond conception. Back of this hotel and on another street above was a slaughter house, situated close to a ravine which ended in a fish pond. This slaughter house had been partially cleaned, but the earth about it was saturated with blood and offal, which upon a warm day was said to be particularly offensive. The ravine leading to the fish pond was made the receptacle for garbage from the town—decayed vegetable matter, old rags, boots, tin cans, and filth of every description. Considering all these sources of pollution, both to the air and the water, we had no difficulty in explaining the sources of disease to the stricken inhabitants. We therefore, at a meeting of the Health Board, explained to it that we believed their malarial diseases came from the slough and Chinese quarters in front of the town, and their typhoid and other diseases from their drinking water and filthy premises—their slops being invariably thrown either back or front of their dwellings, to fester and decay under their very noses. We advised, therefore, that a deep drainage channel be cut through the slough, not less than four feet on top and at least three feet deep, and, if possible, to carry the water down the ravine through a vitrified pipe, or at least in a well graded drain, properly trenched. We also advised the Board to declare Chinatown a nuisance and have it removed, its ponds filled up, and to permit no more ordure to be collected, except when properly deodorized and disinfected. We also advised the removal of the slaughter house from its present site, the ravine cleaned out, the fish pond abolished, and no more garbage be permitted to be thrown into the ravine. We also advised the abolition of the privy vaults, and the substitution thereof of earth closets; the cleaning of all wells, and the boiling of the water before drinking. It was also advised that an ordinance be passed forbidding the pollution of the ground with house slops; that properly cemented vaults be built some distance from the dwellings, and into these the house slops be conveyed by earthen pipes, properly trapped. We believe that with these sanitary reforms the usual healthy condition of the inhabitants would, after a little time, be restored, and that paludal and filth fevers would cease to exist. The Board thanked us very warmly for our visit and promised to have our advice strictly followed, and would then report the result.

On motion, the action of the Secretary was indorsed and approved.

The proximity of dug wells to privies was discussed, and the effect upon the water commented upon. It was concluded that the water of dug wells was dangerous as a beverage from surface drainage alone, and recommended that all such water needed boiling to render it safe. Dr. C. A. Ruggles explained that in Stockton, where the drinking water is all taken from wells, the wells are cased, the borings passing through a thick stratum of blue clay, which is impervious to surface water. When the blue clay is passed through, the auger passes into a stratum of gravel and sand, through which the water percolates, at a depth of a hundred or more feet. The water is perfectly pure and sweet, and being protected by the iron pipe through which it passes, it cannot become polluted by seepage or surface water. To the very purity of this water and its general use, Dr. Ruggles attributes the remarkable healthfulness of the inhabitants of Stockton, the rarity of typhoid fever, and the low death rate. He believed that all drinking water ought to be taken from a great depth, and through cased wells, when such source is possible. Where surface contamination and the soil will permit of privy percolation into a dug well, the water cannot be fit for domestic use, except it is first boiled.

Dr. Cluness remarked that the water of the Sacramento River, although it looked muddy, and was muddy, it was good drinking water when it was filtered and boiled. For his own family use he had the water filtered and then boiled, and he knew of no better water for general use than the Sacramento River water when thus treated.

Dr. Orme said that the water of Los Angeles was not of the very best, and he had no doubt would be improved if it was boiled before using.

The Secretary read a communication from General McComb, Warden of the State Prison at San Quentin, relative to the removal of dead bodies prior to the statute limitations for such removal. The District Attorney of Marin County having given his opinion that such could be done, General McComb, following this opinion, had consented to the resurrection of a body one month after burial.

On motion of Dr. Cluness, seconded by Dr. C. A. Ruggles, the Secretary was requested to obtain from the Attorney-General a written opinion upon the legality of removing dead bodies under two years' burial, as now laid down by the Code in the Act of 1878, page 1,050. It was so ordered.

The Secretary reported that the Legislature, at the request of the State Board of Health, passed the following bills which had received the Governor's approval:

AN ACT

To encourage and provide for a general vaccination in the State of California.

[Approved February 20, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated; *provided*, that any practicing and licensed physician may certify that the child or person has used due diligence, and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this Act.

SEC. 2. The Trustees or local Boards, annually, or at such special times to be stated by

the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

SEC. 3. The said Trustees or Board must, within sixty days after the passage of this Act, and every year thereafter, ascertain the number of children or persons in their respective school districts or subdivision of the city school government being of an age suitable to attend common schools, who have not been already vaccinated, and make a list of the names of all such children or persons. It also shall be the duty of said Trustees or Board to provide, for the vaccination of all such children or persons in their respective school districts, a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated. And when so vaccinated to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section one.

SEC. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town. And if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the county treasury for the use of the district.

SEC. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and seventeen years who are vaccinated, and the number unvaccinated.

SEC. 6. This Act shall take effect immediately.

After some discussion as to the enforcement of this law at the present time, Dr. C. A. Ruggles thought that perhaps we might wait for an epidemic, as then the law might be universally complied with.

Dr. W. R. Cluness did not agree with Dr. Ruggles, but thought that we ought to order a general vaccination this fall, and have every person protected from smallpox as soon as practicable.

Dr. Ruggles agreed upon this proposition, and proposed to renew the subject at the meeting in October.

The Secretary reported that the following bill had received the Governor's approval:

AN ACT

To amend section three thousand and eighty-four of an Act entitled an Act to establish a Political Code, approved March 12, 1872, relative to the interment or cremation of human bodies.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and eighty-four of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, is hereby amended so as to read as follows:

Section 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit therefor. In incorporated cities, or counties, or cities and counties, the permit must be obtained from the person authorized to grant the same by any law, ordinance, or resolution passed for that purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a permit must produce and file with the officer issuing the permit, a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth as near as possible the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code; but if any other registration of the death of the deceased shall have been made, the Recorder must record the name but once.

SEC. 2. This Act takes effect thirty days after its passage.

In addition to this law, the Secretary reported the following amendment to the Penal Code, which provides for the punishment of those who fail to keep the law relative to interments and the public health:

AN ACT

To amend section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February 14, 1872, relating to the disposal of human dead bodies, and preservation of the public health.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 377. Every person who is charged with a duty relating to the registration of deaths, under chapter three, title seven, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,

2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,

3. Willfully interrs, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without having first obtained a permit, as provided for in said chapter; or,

4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,

5. Willfully violates any of the laws of this State relating to the preservation of the public health;

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

The law relating to the establishment of Boards of Health also received the approval of the Governor. Unfortunately it was printed containing a typographical error, "eighty-seven" being printed instead of "eighty-nine." This may make the enforcement of the law a matter of some difficulty, if any community is foolish enough to resist it. The error was noticed in time, and referred back to the Assembly, where we were assured it was corrected. Through some neglect of the proper officers, it was again overlooked, and the bill printed with the original mistake uncorrected, as follows:

AN ACT

To amend section three thousand and sixty-two of, and to add a new section to, an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relating to Boards of Health.

[Approved March 1, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and sixty-two of said Act to establish a Political Code is amended so as to read as follows:

Section 3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles.

SEC. 2. There is added to said Code a new section, to be called section three thousand and sixty-four, which shall read as follows:

Section 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officers, and provide for the expense of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town, neglects to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-seven, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health, or Health Officer with the powers of a Board of Health, for such town or city, and the expenses of

such Board of Health or Health Officer shall be a charge against the incorporated city or town for which such appointment shall be made; and when the appointment is made for unincorporated towns the expenses of the Board of Health or Health Officer is a charge against the county.

On motion, it was resolved that the Secretary be instructed to issue a circular letter to the Supervisors, Trustees, or Councilors of the different counties, advising them of these laws, and printing the same for their instruction, and requesting them to act at once upon their provisions. Carried.

The Secretary reported that owing to the expenses of the State Board for the fortieth fiscal year exceeding its appropriation, he had a deficiency bill passed as follows, which will carry the Board through until June, 1889:

AN ACT

Making an appropriation for the deficiency in the appropriation for the necessary expenses of the State Board of Health for the fortieth fiscal year.

[Approved March 7, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The sum of five hundred dollars is hereby appropriated out of any money in the State Treasury not otherwise appropriated, for the payment of the deficiency in the appropriation for the necessary expenses of the State Board of Health for the fortieth fiscal year.

SEC. 2. This Act shall take effect immediately.

In order that this deficiency may be avoided in the forty-first and forty-second fiscal years, your Secretary had the regular appropriation of the Board increased \$500, so that now our Board is in receipt of all the income permitted by the law organizing the Board. If our work extends, as it must do as the State becomes more populous, it will be necessary to have our funds increased. A law regulating quarantine, and the admission of horses, cattle, sheep, and swine into the State of California from infected districts, was passed and received the Governor's approval. Subsequent examination, however, discovered the fact that the law had never passed the Assembly in due form. Doubt being expressed upon its legality, it was, on motion, resolved that action on it be postponed at present.

The credentials of applicants for the position of Quarantine Officer under the bill were not considered, from the above cause intervening.

On motion of Dr. Cluness, it was resolved that we adjourn, to meet in Dr. Simpson's office, in San Francisco, at 8 o'clock on Tuesday evening next.

On motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco, April 16, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Brice-land, Dr. C. A. Ruggles, Dr. W. R. Cluness, Dr. Jas. Simpson, and Dr. R. Beverly Cole. Dr. Barger, Health Officer of San Francisco, and Dr. S. S. Herrick, Assistant Secretary, were also present by invitation.

The minutes of the last meeting having been read and approved, Dr.

Cluness observed that the law requiring general vaccination of all children attending the public schools was mandatory in its provisions, requiring to be put in operation in sixty days after its passage. He therefore thought we ought to take action in accordance with law.

Dr. R. Beverly Cole therefore moved that whatever action this Board has taken in deferring the institution of general vaccination of school children immediately be rescinded. This being seconded by Dr. Cluness, was carried.

Dr. Cluness then moved that the Secretary be instructed to notify the different authorities whose duty it is to carry out the provisions of the law, to take immediate steps to do so.

The Secretary was also instructed to have published the law relating to the punishment for neglect to obey the health laws of the State.

Dr. S. S. Herrick said that the chief duty of a Sanitary Inspector, the bill for the creation of which was refused signature by the Governor, would have been to see personally that the sanitary laws were obeyed throughout the State, as it would be a matter of impossibility for the Secretary of the Board to attend to this duty, in addition to the clerical work indispensable in connection with his office. Had the Governor signed this bill, instead of allowing it to repose in his pocket, it would have made a great difference in the sanitary welfare of the State, and have been the means of unifying the local Boards everywhere with the State Board.

The question of quarantine was next introduced for discussion.

Dr. R. Beverly Cole stated that he had lately received a letter from Surgeon Sawtelle, U. S. M. H. S., in which he informed Dr. Cole that the plans were now being drawn for the erection of a suitable building on the grounds selected by the Commission at Angels Cove; that a disinfecting steamer had been ordered, and that every modern appliance would be instituted for the purpose of facilitating the discharge of passengers, and the rapid disinfection of cargoes and ships.

The Board felt satisfied that progress had been reported, as it was anxious before the dangerous season arrived that means of prevention would be provided at the earliest possible moment by the Government.

The question of leprosy was now discussed, Dr. Barger reporting some cases now in the pesthouse.

Dr. H. S. Orme reported that he was now preparing a paper upon leprosy for our next Biennial Report, and for that purpose asked Dr. Barger to have some negatives and photographs taken of those patients in the Twenty-sixth-Street Hospital. The cost of these negatives would be \$14. Dr. Orme did not know whether their cost would come under the legitimate expenses of the Board or not. Upon discussion of this subject, the members unanimously agreed that as the plates were for the use of the Board, the bill should be paid by it.

It was therefore moved and seconded that the Secretary be authorized to pay the bill on its presentation.

On motion, the meeting then adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary on July 11, 1889.

Present—Dr. H. S. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Briceland, Dr. W. R. Cluness, and Dr. C. A. Ruggles.

The minutes of the last meeting were read and approved.

The Secretary read a communication from Hon. Marcus D. Boruck, Private Secretary to the Governor, addressed to the Board of Health, and calling its attention to a telegram from Governor Waterman, reporting the shipping of cattle, consisting of two thousand head, to this State, and affected with Texas fever.

On motion of Dr. Cluness, the letter was received and placed on file.

The Secretary reported that he had received a communication from Dr. Thos. Bowhill, veterinary surgeon, relative to the presence of anthrax in a dairy near San José. Upon receipt of this report the Secretary addressed a letter to the Mayor of San José, advising him of the fact, and requesting the organization of a Board of Health, to take action to protect the public against diseased milk that might come from this dairy.

On motion of Dr. Ruggles, the communication of Dr. Bowhill was placed on file, and the action of the Secretary approved.

A communication was read from Dr. Prevost, of San José, advising that a Board of Health had been organized in San José, and a Health Officer appointed.

The Secretary read a communication from Dr. S. S. Herrick, of San Francisco, relative to the prevention of contagious diseases in cattle, and suggesting that precautions be taken immediately in the way of burning the stubble upon which such cattle grazed, and having all cattle dying of such disease cremated.

On motion, the letter was placed on file, and the Secretary requested to communicate with Dr. Salmon, of the Bureau of Animal Industry, and inform him of the presence of splenic apoplexy in the Santa Clara Valley, and to request him to take such means as may come within his province, to arrest the spread of the disease, and to destroy the diseased cattle; which was carried.

On motion of Dr. W. R. Cluness, the Secretary was instructed to communicate with the Supervisors of the Santa Clara Valley, and notify them that splenic fever exists in their country, and request them to take some action in the matter if they have not already done so; which was carried.

The Secretary then read the opinion of the Attorney-General upon the question of exhuming human bodies before the two years had expired, which was designated by law as the earliest time in which such exhumation could take place.

On motion of Dr. Briceland, the letter of the Attorney-General was received and placed on file for future action.

The Secretary then read several letters from County Recorders, Boards of Health, etc., requesting information regarding burial permits, death certificates, and registration blanks.

On motion of Dr. C. A. Ruggles, it was—

Resolved, That the Secretary be authorized to design and have printed sufficient burial permits and death certificates to supply all Health Officers and others in need of such certificates to carry out the law relating to deaths in this State, and also, when necessary, to supply blanks for marriages and births as required by sanitary officers.

Carried unanimously.

The subject-matter of river pollution having been introduced it was, on motion—

Resolved, That it having come to the knowledge of this Board that it is contemplated to divert the sewage of certain towns bordering upon the Sacramento River into said stream, it is the sense of this Board that such diversion of sewage will be prejudicial to the public health, and should not be permitted under any circumstances.

Which was carried.

It was moved by Dr. Briceland, and seconded by Dr. Cluness, that Dr. Ruggles be requested to ascertain the wishes of Governor Waterman in regard to an official visit by the members of the State Board of Health to the various institutions drawing State aid this year. Carried.

On motion of Dr. Cluness, the Secretary was instructed to renew the subscriptions of the State Board to the Annals of Hygiene. Carried.

It being the sense of the Board that the State of California should be represented at the next meeting of Conference of State Boards of Health, it was moved that Dr. C. A. Ruggles be appointed our delegate to represent this Board at the Conference of State Boards of Health. Carried.

After a general discussion upon matters of sanitary interest, there being no further special business, on motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, October 12, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Briceland, and Dr. C. A. Ruggles. Dr. Cluness was unable to be present, owing to illness, and Drs. R. Beverly Cole and James Simpson were absent from the State.

The minutes of the last meeting having been read, and on motion approved, Dr. Ruggles desired to relate his experience in relation to the opinion of the Attorney-General concerning the exhumation of bodies before the time stated in the Political Code. He said that a body that had died in Stockton Insane Asylum was buried, but shortly afterward the relatives of the deceased desired to remove it to San Francisco. As the death occurred outside the city of Stockton, Dr. Ruggles, in accordance with the expressed opinion of the Attorney-General, gave a permit for the removal of the body, although only a short time buried. This action was not acceptable to the authorities in San Francisco, and they wrote a letter to Dr. Ruggles protesting against his action, to which Dr. Ruggles replied, citing his authority.

The question brought before the Board was now fully discussed, and upon motion the course pursued by Dr. Ruggles was indorsed.

Dr. Ruggles reported, in regard to the visiting of institutions receiving State aid, that after an interview with the Governor's Secretary the Governor wrote him a letter asking him to visit those institutions supported by the State, and make his report regarding their sanitary condition. Dr. Ruggles stated that in accordance with the Governor's instructions he had visited these institutions, and would make a detailed report hereafter.

On motion of Dr. J. M. Briceland, the action of Dr. Ruggles was approved, and his expenses ordered paid.

The Secretary read the following letter from Dr. D. E. Salmon, in reply to the request of the Board that he take some action to guard against the spread of Texas fever in our southern counties:

U. S. DEPARTMENT OF AGRICULTURE, BUREAU OF ANIMAL INDUSTRY, }
WASHINGTON, D. C., July 24, 1889. }

SIR: Referring to your favor of the thirteenth instant, in which you notify me of the request made by your Board that this department send a competent Inspector to Santa Clara Valley to prevent the spread of splenic fever, I would say that this department has no authority to enforce measures for such a purpose within your State. I see no way by which the losses from this disease can be prevented except by a State law, which would prevent the movement of cattle from the infected districts during the month of the year when they are liable to carry the contagion. After the season is advanced, and the cattle have been moved, the pastures are infected, and it is impossible to adopt any measures which will prevent the disease. Regulations should go into force early in the season, probably as early as February, in that climate.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

On motion of Dr. Briceland, the letter was received and placed on file.

The Secretary read a communication from Dr. Lathrop, of San Pedro, asking the Board for the appointment of a Quarantine Officer, or, if he had the power, to appoint himself.

On motion, the Secretary was instructed to write to Dr. Lathrop, and give him the opinion of the Board that such appointment lay with the Board of Supervisors.

The Secretary read a number of letters from different District Attorneys regarding the operation of the health laws, which, on motion, were placed on file.

The Secretary read a communication from Dr. Dodson, of Red Bluff, regarding the dumping of sewage into the Sacramento River, which was discussed and placed on file for further action, if deemed advisable.

In regard to the question of emptying the sewage of Redding into the Sacramento River, the Secretary reported that he had addressed the following letter to Jerry Culverhouse, Mayor of Redding:

SACRAMENTO, July 27, 1889.

DEAR SIR: I am instructed by the State Board of Health to inquire whether it is or is not a fact, that it is the intention of the authorities at Redding to convey the sewage of that town into the Sacramento River, and thus pollute its waters to the detriment of the public health. If such should be the case, it will become the duty of the State Board of Health to enjoin any such action as prejudicial to the welfare and best interests of the State. An answer will oblige,

Yours respectfully,

GERRARD G. TYRRELL,
Secretary.

In response to this document, the following letter was received:

REDDING, CAL., August 1, 1889.

Mr. G. G. TYRRELL:

DEAR SIR: On my arrival home from the city, found your letter of the twenty-seventh, asking if it were the intention of the authorities of Redding to sewer to the Sacramento River. In reply, I will say to you the City Council will meet the first Monday in August, then I will place your letter of inquiry before that meeting for their consideration, and inform you of the result.

Respectfully yours,

JERRY CULVERHOUSE,
Mayor of Redding.

The Secretary reported that since the receipt of that letter no communication as to the action of the Redding Trustees had been received.

Dr. Briceland was happy to say that since the action of this Board was understood, the city of Redding had abandoned the idea of putting its sewage into the river, and had made arrangements for utilizing it upon a sewage farm.

The Secretary read a communication from F. T. Newberry, civil engineer, suggesting that before any town or city disposes of its sewage, the plans of the same be submitted to the State Board of Health for its approval, especially regarding the outfall, the condition of the mass of sewage in which it is to be left, and how it will affect other citizens.

On motion, the communication was received and placed on file.

Dr. C. A. Ruggles presented a communication and opinion from the District Attorney of San Joaquin, defining a nuisance, and including in it the discharging of sewage into streams used for potable purposes; which, on motion of Dr. Briceland, was received and ordered spread upon the minutes, as follows:

In reference to the alleged public nuisance referred to me, I submit as follows:

"A public nuisance is one which affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be equal. (Civil Code, Section 3480.) Anything that is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, as unlawfully obstructing the free passage or use in the customary manner of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway, is a nuisance. (Civil Code, Section 479; Penal Code, Section 370.)

"That which is or will create a nuisance is a question of fact, and one can only draw a conclusion upon that state of facts which do exist, or if they did exist, a conclusion upon what would be the result.

"If the state of facts do exist, and the sewage of any city or town is turned into a public stream, and as a conclusion from the facts, and result of such, it should impair the health of the individuals along said stream, or should make the waters therein indecent or offensive by its pollution, or interfere with the comfortable enjoyment of life or property along said stream, it would undoubtedly be a public nuisance.

"Yet if, on the other hand, the water of said stream is unused for any purpose, and the stream is wide enough and deep enough to carry said sewage without noticeable effect as to health, and does not interfere with the comfortable enjoyment of life and property, it is not a public nuisance within the meaning of the statute, providing it does not obstruct the navigation of said stream. Therefore, in conclusion, I would say that the facts as they exist can only be known through an investigation which the Board of Health are presumed to make, and if such a state of facts exist as would in this instance come under the provisions of the Code named, no one but a physician would be better able to draw the conclusions, and which, not desirous to take from the duties and authority of the District Attorney of the county where such instances may exist, yet always being ready to assist a public officer in the discharge of his duty, I respectfully submit the above."

(Signed:)

AVERY WHITE,
District Attorney, San Joaquin County.

Dr. C. A. Ruggles moved that a committee of three be appointed to investigate the source of any pollution that may be conveyed into our rivers used for domestic purposes, and said committee shall require of all incorporated cities and towns to furnish plans or plan of their sewage disposal for the use and publication of the State Board of Health; which was carried unanimously.

The President appointed as such committee Dr. Briceland, Dr. Ruggles, and Dr. Tyrrell.

Dr. Ruggles asked leave to present the following resolution:

WHEREAS, Having officially inspected the sanitary condition of the State Prisons at San Quentin and Folsom, and being satisfied that a certain class of criminals among those suffering from pulmonary disease are injuriously affected by confinement in San Quentin; therefore, be it

Resolved, That a circular be issued by the State Board of Health to the Superior Judges of each county of the State, requesting them that, before sentencing a criminal to the State Prison, an examination be made by the County Physician regarding the physical condition of the prisoner, and if any pulmonary disease be present or likely to develop, that such prisoner be sentenced to Folsom Prison instead of to San Quentin.

Which was seconded by Dr. Briceland.

At the request of Dr. Ruggles the consideration of the resolution was postponed until the next regular quarterly meeting of the Board.

Dr. H. S. Orme stated that he had visited San Francisco for the purpose of investigating cases of leprosy in that city. He had discovered that two cases had been imported from New York in the persons of two Chinamen. Another case came from Napa. He reported progress with his report upon the subject of leprosy, for publication in the next Biennial Report.

There being no further business to come before the meeting, upon motion, it adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, January 11, 1890.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Dr. C. A. Ruggles, Dr. W. R. Cluness, and Dr. B. Payton, of Stockton, by invitation.

The Secretary read a communication from Dr. J. M. Briceland, of Shasta, regretting his unavoidable absence, owing to severe illness.

Dr. James Simpson, of San Francisco, also sent his regrets at his absence, which was also owing to illness, from which he had not sufficiently recovered to warrant his presence.

The minutes of the last meeting having been read and approved, the Committee on Investigating the Sewerage of Towns reported that owing to the severity of the weather since last meeting, they did not deem it expedient to visit those towns at present, and asked an extension of time, which was unanimously granted.

The resolution offered by Dr. Ruggles at the last meeting of the Board now came before it for action.

Dr. Ruggles explained the reasons for his resolution and described his impressions of the State Prison at Folsom, and was surprised at the healthy condition of the inmates and the general absence of sickness among them. When visiting San Quentin, Dr. Ruggles was not so surprised, owing to the situation of the prison, to see so many cases of consumption, as he believed the climatic influences there had a great deal to do with it. In this view he was sustained by the Resident Physician, Dr. F. C. Durant, who agreed with Dr. Ruggles that the situation developed tuberculosis in those predisposed to it. Dr. Ruggles then explained why he desired his resolution to lie over until this meeting, being desirous of hearing the opinion of those members of the Board who reside in San Francisco.

Dr. W. R. Cluness was of the opinion that the frequency of tubercular diseases in the prison might be attributed more to the age of the prison than to its climatic surroundings. He believed that disease germs

had permeated the cells throughout, and never having been thoroughly disinfected, new occupants were more prone to become infected. As he was a firm believer in the contagious nature of consumption, he thought this fact was sufficient to account for its frequency. Folsom Prison, on the contrary, was a comparatively new prison, and had not the same opportunity offered by age to become infected. He would, therefore, offer an amendment to Dr. Ruggles' motion: "That all cells containing, or having contained, tuberculous patients be properly disinfected, and the surgeon of the prison be requested to have disinfected all such contaminated cells."

Dr. Cluness, in offering the amendment, did so from the belief that climatic influences was not so potent a factor in the production of phthisis as would appear from Dr. Ruggles' resolution, but would agree to Dr. Ruggles' resolution if that clause in reference to climate were omitted and the disinfection of cells be agreed upon. Dr. Ruggles would accept the amendment, as his object was to have those prisoners afflicted with tubercular diseases removed to a more suitable climate for pulmonary ailments, and fully agreed with Dr. Cluness in the necessity of having cells disinfected that are, or might have been, occupied by consumptive persons. Therefore, the resolution, as amended, reads as follows:

WHEREAS, Having officially inspected the sanitary condition of the State Prisons at San Quentin and Folsom, and being satisfied that a certain class of criminals among those suffering from pulmonary disease are injuriously affected by confinement in San Quentin; therefore, be it

Resolved, That a circular be issued by the State Board of Health to the Superior Judges of each county of the State, requesting them that before sentencing a criminal to the State Prison, an examination be had by the County Physician regarding the physical condition of the prisoner, and if any pulmonary disease be present or likely to develop, that such prisoner be sentenced to Folsom Prison instead of to San Quentin, and that the surgeon of the prison be requested to have disinfected thoroughly all cells occupied by consumptive prisoners, and such cells as have been occupied by tuberculous patients at any time.

Dr. Cluness seconded the resolution, which was then carried unanimously.

The Secretary read a communication from Dr. Mitchell, of Redding, presenting an ordinance passed by its Board of Health, ordering the display of signal flags on houses containing infectious disease.

Dr. Ruggles moved that this action of the Board of Health of Redding be approved, and that this Board would be pleased to see all towns and cities taking like precautions to resist the spread of infectious disease; which was carried.

The Secretary read a communication from Health Officer Dr. Lathrop, of San Pedro, which was ordered placed on file.

Dr. H. S. Orme reported that he was preparing his report on leprosy, and was making progress. He, in connection with the subject, begged leave to offer the following resolutions:

WHEREAS, The Iowa State Board of Health has deemed it proper to adopt resolutions petitioning Congress on account of the importation of leprosy into that State; therefore, be it

Resolved, That the California State Board of Health recommend that the Congress of the United States do enact a statute,

First—That no person affected with leprosy should be permitted to enter the United States.

Second—That every person immigrating to the United States from any place where leprosy prevails shall procure a certificate from a competent physician, properly attested by some United States Consul or Health Officer, certifying that he or she is not affected with leprosy, is not a descendant from a leprous family, and has no relations in the co-lateral line who are lepers.

Third—That every immigrant coming to the United States who has sojourned or resided where leprosy prevails shall be reported to the Board of Health of the State of his destination, so that he may, during his residence in the United States, be inspected not less than twice each year by some competent physician or person appointed by the health authorities of the place wherein he resides, for a period of ten years.

Fourth—That the penalty for the violation of the first two sections of this statute shall be the immediate return of such person to the place whence he or she came.

Resolved—That the California representatives in Congress be and they are hereby earnestly requested to vote for the enactment of such a statute, and that the Secretary of this Board be instructed to furnish said Congressmen a copy of these resolutions, duly signed by the President and attested by the Secretary.

Dr. Cluness thought this to be a most important subject, and begged to second the resolutions, which were carried unanimously.

There being no further business before the Board, the meeting, on motion, adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, April 12, 1890.

Present—Dr. R. Beverly Cole, Dr. James Simpson, Dr. C. A. Ruggles, Dr. J. M. Briceland, and Dr. G. G. Tyrrell. Absent—Dr. H. S. Orme and Dr. W. R. Cluness.

A telegram was read by the Secretary from President Dr. H. S. Orme, regretting his unavoidable absence, owing to illness.

Dr. Ruggles thereupon moved that Dr. R. Beverly Cole take the chair in absence of President Orme, which was seconded by Dr. J. M. Briceland, and unanimously carried.

The minutes having been read and approved, the Secretary read a communication from the Superior Judge of San Benito County, which, on motion, was received and placed on file.

A communication from Hon. Thos. J. Clunie was also read and placed on file.

A communication from the District Attorney of Napa County was received and placed on file, and the recommendation therein acted upon, the Secretary being instructed to issue a circular as suggested.

A communication was read from Surgeon Hamilton, U. S. M. H. S., in reply to inquiries made by the Board as to the progress of the quarantine stations at San Francisco and San Diego, which was received and ordered placed on file, and the Secretary requested to correspond with Surgeon Hamilton, asking his views as to what methods or means would be suggested by him to enable this Board to aid him in carrying out the ideas expressed in his letter.

Dr. Simpson moved, which was seconded by Dr. Briceland, that the Secretary be requested to have a pamphlet published, containing all the State laws relating to health, and also, under a separate heading, the health ordinances existing in each county, town, or city in the State, for the guidance and instruction of Boards of Health and Health Officers. Unanimously carried.

A communication was received from Dr. H. S. Orme, inclosing a correspondence relating to lepers, which was read and ordered placed on file.

A circular from the National Conference of State Boards of Health was received, requesting our Board to name a delegate or delegates to the Conference, and to choose a subject for discussion at the meeting.

Dr. J. M. Briceland moved, and it was seconded by Dr. James Simpson, that Dr. C. A. Ruggles be appointed as delegate to the National Conference to represent this Board, and that the subject chosen for discussion be: "How to prevent the contamination of potable water." Unanimously carried.

It was also—

Resolved, That it is the sense of the California State Board of Health, that for the better promotion of sanitary sciences in these United States, the meetings of the Conference of State Boards of Health be amalgamated with the meetings of the American Public Health Association, as part of said association. The cost of attendance upon both meetings, as now ordered, being a burden which distant States are unable to meet, owing to the lack of funds placed at their disposal for such contingencies; and be it further

Resolved, That our delegate be instructed to advocate and support such resolution before the Conference.

Which was unanimously carried.

There being no further business before the meeting, on motion, it adjourned.

GERRARD G. TYRRELL,
Secretary.

REPORT OF PERMANENT SECRETARY.

To the State Board of Health:

GENTLEMEN: The period has arrived when it becomes the duty of your Secretary to present for your consideration his Biennial Report, now the eleventh in the series. Since the organization of the Board in 1870, its progress in the sanitary improvement of the State has been slow, and beset by many difficulties. A review of the work accomplished in the past few years will encourage us in the belief that a new era has dawned upon our Board, and the desire of the public for increased knowledge in the means of remedying the defects in the sanitary administration of the State has increased in a manner heretofore unrecognized. There seems to be a general awakening to the importance and necessity of sanitary measures if we would retain the prestige of the State as one of the most healthy in the Union; we are becoming convinced that we cannot do so if we allow our potable waters to be polluted, our air poisoned by the emanations of accumulated filth, and our food adulterated by the conscienceless dealer. As a result of the protestations of our Board, we find the Legislature coming to our aid in giving us laws to compel the organization of Boards of Health everywhere within the State. Through these our Board is endeavoring to establish a system of sanitary communication, and by them to be forewarned of any epidemic diseases that may exist in their respective communities, of all dangers that may threaten the purity of our potable waters or the healthfulness of our food supply. But with all this help we are still far away from anything like perfection. As Lord Derby says: "No sanitary improvement worth the name will be effective, whatever Acts you pass, or whatever powers you confer upon public officers, unless you create an intelligent interest in the matter among the people at large." To do this has been the chief aim of your Board for some years, and we believe that to a certain extent we are succeeding, by publishing every month a record of the number of deaths reported to us, giving the causes thereof, and commenting upon the extent of the diseases, their location, together with some sanitary advice or comment in every number; this has engendered an interest in health news, so that we find the daily press coöperating in our work by giving a large circulation to the sanitary facts therein enunciated.

This education of the people through the press is now bearing fruit, and the difficulty experienced heretofore in getting people to look after the sanitary welfare of their towns and dwelling places is fast disappearing. Hardly a day passes that your Secretary has not been consulted as to the best means to be adopted to have such and such a nuisance removed, or such and such a water supply protected from contamination, or asking that our Board order a Health Officer appointed for such and such a district, or complaining that so and so was neglecting his duty as a Health Officer. All this indicates an awakening of public sentiment, and a growing belief that sanitation is essential to health and longevity, and that in the State Board of Health a way will be found through

which people may be surrounded by an atmosphere of cleanliness and healthfulness, and lives may be, if not positively prolonged, at least rendered happier by the absence of preventable diseases. To realize fully the benefit to be derived from the operations of a State Board of Health, it should be clothed with mandatory power. The State Board of Health of Illinois, for example, has charge of all matters pertaining to quarantine; in times of epidemic it has full authority to prevent invasion of disease by closing the portals of admission to the State.

It can at its discretion put railroad and steamboat traffic under its control; it can at all times make such rules and regulations and undertake such sanitary investigations as it may from time to time deem necessary for the preservation or improvement of public health; it can command the services of all police officers, Sheriffs, Constables, and all other officers and employés of the State, to enforce such rules and regulations, so far as the efficiency and success of the Board may depend upon their official coöperation. Our Board, unfortunately, is clothed with no such strength; it is not empowered by its own act to oppose any barrier to the progress of infectious or contagious diseases in any direction. All executive authority is placed in local Boards of Health, and they are responsible for the sanitary condition of their respective towns. Each local Board may enact its own sanitary regulations, which, after approval of the Trustees, Council, or Supervisors, and published in a prescribed method, have the authority and effect of law. The power and authority to act to bring about results and accomplish sanitary reforms, rests in the town Board of Health. The State Board of Health has no authority to enforce sanitary reforms; its functions as a conservator of public health are those of an advisor and counselor. It is the highest authority in the State upon the principles of sanitary science as applied to State medicine. It is the source from which the people, public officials, and local Boards of Health may seek for information on questions of public hygiene. Its duties are not executive, but rather those of a teacher, and also of a learner; for in its charter is specified that "it shall take cognizance of the interests of health and life among the citizens; it must make sanitary investigations and inquiries respecting the causes of disease, especially epidemics, the source of mortality, and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to those matters as it may deem proper for diffusion among the people."

The State Board of Health is the head of the administration of public hygiene in the State, but no power is conferred upon it to dictate to or direct the local Boards; we can only give them information, advice, and practical suggestions when requested, and keep them advised of any danger to the public health. If local Boards neglect to perform their duty, the State Board is powerless to compel them to it, except indirectly, by arousing public sentiment against such inaction and exposing the dangers to which such inaction invites. This being the relation which the State Board bears to local Boards, it becomes necessary, in order to secure beneficial results to the State, to compel the organization of local Boards of Health or Health Officers throughout the State. In every town having five hundred inhabitants it is an absolute necessity, and to this end your Secretary has been turning his attention ever since the passage of the law authorizing such action. The result has not been quite satisfactory, but progress so far shows us that we are

in closer relation with every part of the State than before. One great drawback that we have to contend with is the difference of the constituted authorities to the formations of Health Boards or appointing Health Officers; many say, "Oh, our town is healthy enough. We have got along so far without Health Officers, why need them now? Time enough when epidemics come to appoint a Health Board." And strange to say, they are sustained in this suicidal policy by many of the most prominent citizens of the place. Again, when requested to appoint a Health Officer we are met with the supposition that the town does not contain five hundred inhabitants.

In one instance where a Health Officer was refused on such a plea, the census showed one thousand two hundred population. Another obstacle placed in the way of sanitary organization, is the unwillingness of Supervisors to allow Health Officers any but the most trifling compensation, and some think such officer should be content with the glory of the name, without fee or reward. It speaks badly for the intelligence of a community that allows itself to be governed by a class of men who are so blind to the welfare of their constituents that they would prefer being compelled through disease to appoint a Sanitary Board, rather than pay a proper officer to prevent its advent. Fortunately, such cases are rare; but, nevertheless, they exist in California to-day. It is just here that the State Board needed more power; the law has now given it to them, or, rather, will give it when the present law is amended by the correction of a clerical error. The following is the law as it stands in the statute books:

AN ACT

To amend section three thousand and sixty-two of, and to add a new section to, an Act entitled "An Act to establish a Political Code," approved March 12, 1872, relating to Boards of Health.

[Approved March 1, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and sixty-two of said Act to establish a Political Code is amended so as to read as follows:

Section 3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles.

SEC. 2. There is added to said Code a new section, to be called section three thousand and sixty-four, which shall read as follows:

Section 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officers, and provide for the expenses of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town, neglects to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-nine, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health, or Health Officer with the powers of a Board of Health, for such town or city, and the expenses of such Board of Health, or Health Officer, shall be a charge against the incorporated city or town for which such appointment shall be made; and when the appointment is made for unincorporated towns the expenses of the Board of Health, or Health Officer, is a charge against the county.

By an unfortunate error the bill was made to read first day of July, 1887, instead of first day of July, 1889. It went to the Governor that way, and was so signed. Although it was apparent to every one in the State that 1889 was intended instead of 1887, yet it will scarcely be believed that this clerical error has been made the basis of willful violation of the law, rendering it nugatory as far as the power of enforcing it lay with our Board. In one county in this State containing several

towns of over five hundred inhabitants, the Supervisors absolutely refused to appoint Boards of Health or Health Officers except as a voluntary measure, their District Attorney assuring them that owing to that one defect in the wording of the law it could not be enforced by our Board. It is a strange commentary upon the civilization of the nineteenth century, that the most beneficent measure possible to be effected for the preservation of the lives, health, and happiness of a community should be objected to because one letter in a law was unwittingly inserted instead of another. At the coming Legislature we hope to have this mistake corrected, and then we trust we will have no further trouble in perfecting sanitary organizations throughout the State, which, by mutual understanding, unrestricted intercourse, and hearty coöperation with the State Board of Health, will place us in a position to guard against the advancement of epidemic disease, or in speedily suppressing it, if it should make its presence known. Although this law regarding local Boards of Health has been impaired in its full usefulness by the fatal defect in its wording, it has not, by any means, been inoperative. The law requiring all incorporated cities and towns to organize local Boards of Health was passed in 1887; under it some nineteen Boards organized; of these, eight alone were active, the others existed in name only, never meeting or doing any sanitary work. No less than forty-one incorporated towns had no health organization whatever, although the law plainly stated that they should; of course, the unincorporated towns had likewise no Health Boards, and so far as any legal protection given to citizens for the defense of their lives from infectious disease was concerned, they had none.

At the session of the Legislature in 1888 the law authorizing the formation of local Boards of Health in unincorporated towns and those containing five hundred inhabitants, was passed; since then, of the sixty odd incorporated towns in the State, inclusive of those not incorporated, the following have organized local Boards of Health or Health Officers that are now in communication with this Board, and doing good sanitary work in their respective localities:

Angels Camp, Alameda, Azusa, Anaheim, Colusa City, Chico, Cloverdale, Colton, Calico, Colfax, Bloomfield, Biggs, Bishop Creek, Berkeley, Bakersfield, Benicia, Downey, Downieville, Dixon, Elsinore, Eureka, El Monte, Folsom, Fort Bragg, Fresno, Gridley, Georgetown, Grass Valley, Haywards, Hollister, Jackson, Julian, Livermore, Los Angeles, Long Beach, Little Stoney, Lincoln, Madera, Modesto, Marysville, Monrovia, Martinez, Mariposa, Napa City, Needles, North San Juan, Nevada City, Orland, San Luis Obispo, Oroville, Oakland, Ontario, Pomona, Petaluma, Pleasanton, Pasadena, Redlands, Rocklin, Red Bluff, Redwood, Rio Vista, Riverside, Sacramento, Santa Monica, Stockton, San Francisco, Susanville, Santa Ana, Santa Paula, San Diego, San Bernardino, San José, Santa Barbara, Suisun, South Pasadena, St. Helena, Solano, Santa Maria, Sierra City, San Pedro, Santa Cruz, Santa Rosa, Sisson, Selma, Truckee, Ukiah, Ventura, Visalia, Willows, Watsonville, Woodland, Yreka, Vacaville, Lodi, Antioch, Oakdale, National City, Pacific Grove, Tehachapi.

We thus have, in active operation, over one hundred Health Boards and Health Officers, up to the end of the fiscal year, June 30, 1890, in looking after the sanitary welfare of their different localities, in contrast with but twenty-two, four years ago; and of these, only one half existed

in anything but name. So far, the law making compulsory the organization of local Boards of Health, or Health Officers, has been fairly successful, but it can be made more so when all legal quibbles to its enforcement are removed.

The law passed at the last Legislature, requiring burial permits to be issued before any human body can be buried, will, in the near future, be generally obeyed. In answer to the following circular upon this and other points, we may give the answers received from seventy-six localities, in different counties, as indicating the general result so far attained in conformity with the law:

CIRCULAR OF THE STATE BOARD OF HEALTH.

SACRAMENTO, March, 1890.

To the honorable Board of Supervisors, Trustees, Councilmen, and Health Officers, of—County, Cal.:

GENTLEMEN: The State Board of Health, desirous of ascertaining certain facts in regard to the operation of the laws relating to public health, with a view of adding to their efficiency at the next session of the Legislature, requests, at your earliest convenience, a reply to the following questions:

First—How many Boards of Health have been organized, or Health Officers appointed, in your county, since the law requiring the same has been passed?

Second—How many towns, with an estimated population of five hundred inhabitants, or over, are there in your county, and their names?

Third—Has the law requiring burial permits to be issued before the interment of any human body in your county been fully obeyed? If not, can you give any reason why it has not been?

Fourth—Has the law relating to the vaccination of public school children been carried into effect by your Board? If not, can you assign any valid reason why it has not?

Fifth—Have births and deaths been reported to and recorded by the County Recorder, as required by law? If not, can you give any good reason why this law has been disobeyed?

Sixth—Have any prosecutions been instituted in your county against offenders for violation of the laws relating to public health?

H. S. ORME, M. D.,
President.

G. G. TYRELL, M. D.,
Secretary.

In answer to the first question, we ascertained that some forty-eight local Boards of Health had been organized, and some forty-nine Health Officers appointed.

To question number two, there were recorded some forty replies, the majority of the correspondents being unable to say what was the number of the inhabitants in their towns.

To the third question, requiring burial permits, the answers were varied:

Alpine County.—There was no Board of Health or Health Officers, and no burial permits were issued.

Contra Costa County.—Burial permits were issued in those places having Health Officers, but in other places the law was not obeyed.

Colusa County.—Burial permits were issued by Health Officers and the law generally obeyed.

El Dorado County.—The law has been generally obeyed.

Fresno County.—The law has been obeyed to a certain extent; the opinion exists that the law is not general, and only applicable to cities and towns, and hence ignored by parties living outside these places.

Humboldt County.—Here the law has not been enforced in towns outside of Eureka, as health organization in the county has been deficient.

Kern County.—Has generally obeyed the law.

Inyo County.—The law has not been enforced, and consequently the mortality of the county unknown.

Lake County.—They have no health organization, and the law requiring burial permits is ignored.

Lassen County.—Dr. Spaulding thinks the law has been generally obeyed, but as the health organization is incomplete, many times it must be evaded.

Los Angeles County.—The law in this county has been, perhaps, better obeyed than in any other; the Health Boards and Health Officers are better organized than in any other county, and consequently see that obedience is exacted.

Calaveras County.—In this county the law is generally ignored, and its mortality is quite unknown in consequence, Angels Camp being the only town reporting to the Board.

Butte County.—The law is generally obeyed where known; any failure is through ignorance.

Alameda County.—The law is generally obeyed where health organizations exist; in other towns such is not the case.

San Joaquin County.—The law is generally obeyed, and where health organizations exist, is enforced.

Siskiyou County.—In this county the law is obeyed where health organizations exist; otherwise not.

San Mateo County.—The law is partially obeyed; not as fully as contemplated by its passage.

Sacramento County.—The law has been obeyed where Health Officers or Boards exist.

Placer County.—The law is generally obeyed.

Orange County.—The law has not been enforced, the health organization of the county being very imperfect.

Nevada County.—The law has been very generally observed.

Napa County.—It has been obeyed wherever health organizations exist.

Mariposa County.—In this county the law has been generally obeyed.

Mendocino County.—The law has been obeyed in a few towns, but oftener neglected.

San Francisco County.—The law is fully obeyed.

San Bernardino County.—The law is partially obeyed, but not fully, owing to the abolishing of the County Health Officer.

Sonoma County.—The law is generally obeyed.

San Diego County.—The law has been generally obeyed; in many of the outlying districts it has not, as no Health Officers were appointed to see that it was.

San Benito County.—Hitherto has not obeyed the law, but is now issuing permits before burial is allowed.

Amador County.—Completely ignores the law, and the District Attorney has made no attempt to enforce it as far as can be ascertained.

Solano County.—Is very generally having the law obeyed, as her health organization is good.

Stanislaus County.—The law has been generally observed in this county.

Sierra County.—The law is carried out where Health Officers are appointed; in other parts it is ignored.

Santa Barbara County.—The law is not obeyed except in Santa Maria and Santa Barbara; ignorance of the law is the supposed cause.

Sutter County.—The law is not generally obeyed in this county, as it has no health organizations.

Santa Cruz County.—The law has only been partially obeyed, arising more from indifference than neglect.

Ventura County.—The law has been ignored here entirely, except in Santa Paula.

Yuba County.—The law has been obeyed wherever health organizations existed.

Yolo County.—The law has been partially obeyed, but in many towns no attention has been paid to it.

San Luis Obispo County.—The law in this county is not obeyed, owing to the lack of sanitary organization.

Shasta County.—The law is partially observed in the county, especially in the incorporated towns.

Tehama County.—The law is not obeyed, except in places having Health Boards or Health Officers.

VACCINATION.

The law making vaccination compulsory on all children attending or desirous of attending the public schools of this State, has up to the present time been held in abeyance, pending the decision of the Supreme Court upon a case that was originally brought in the Superior Court of Santa Cruz County, by D. K. Abeel against D. C. Clark, Principal of the High School of that county, to compel the admission to the school of his two sons, D. K. and James, who were refused admission to the school because of non-compliance with the Vaccination Act, and the Court gave judgment in favor of the Principal. Abeel took an appeal to the Supreme Court, which tribunal has affirmed the decision of the Court below. The Court says:

The Act referred to is designed to prevent the dissemination of what, notwithstanding what medical science has done to reduce its severity, still remains a highly contagious and much dreaded disease. While vaccination may not be the best and safest preventive possible, experience and observation, the test of the value of such discoveries, dating from 1796, when Jenner disclosed it to the world, have proved it to be the best method known to medical science to lessen the liability to infection with the disease.

This being so, it seems highly proper that the spread of smallpox through the public schools should be prevented or lessened by vaccination, thus affording protection both to the scholars and the community.

Vaccination, then, being the most effective method known of preventing the spread of the disease referred to, it was for the Legislature to determine whether the scholars of the public schools be subjected to it, and we think it was justified in deeming it a necessary and salutary burden to impose upon that general class. The remarks of Judge Cooley in his work on Cons. Lim., p. 157, are applicable here, where he says: "What is for the public good, and what are public purposes, and what does properly constitute a public burden, are questions which the Legislature must decide upon its own judgment, and in respect to which it is invested with a large discretion which cannot be controlled by the Courts, except, perhaps, when its action is clearly evasive, and where under pretense of lawful authority it has assumed to exercise one that is unlawful."

The decision of the Supreme Court having now definitely settled the constitutionality of the law, we expect that no trouble will be experienced in having it enforced. The protection given to the State by this law against the spread of smallpox is beyond computation, as if properly carried out and the rising generation successfully vaccinated by competent physicians, we need be under no apprehension of any

extensive epidemic taking place. In this State especially, this precaution is absolutely necessary, as we are constantly threatened by an invasion of the disease through Mexico, where it is endemic.

BIRTHS.

The fifth question, "Have births and deaths been reported to and recorded by the County Recorder?" has been answered by the majority, that the law has been obeyed where Health Boards and Health Officers existed, but otherwise, parties were indifferent to the registration, as they did not see why they should do the State any service without adequate compensation therefor. For this reason, births have not been returned or recorded except in a very few instances.

The State Board of Health at the last session of the Legislature presented a bill providing for the registry of births and deaths, for which a compensation of 25 cents was to be allowed for each birth and death filed with the County Recorder, which passed the Senate and Assembly, but, for some reason, failed to be transmitted to the Governor for his signature. This omission, your Secretary finds, has prevented the recording of births, and, no doubt, many of the deaths in this State, which would have been duly certified to by the interested parties. This omission must be rectified at the next meeting of the Legislature, in order to collect the vital statistics of the State with anything like unto completeness. In regard to prosecutions for non-compliance with the law, we find that in Pomona one physician was fined \$10 for not reporting a death. In Fresno and Merced, some recalcitrant physicians have been prosecuted; parties have also been prosecuted in El Dorado, San Mateo, Alameda, Placer, Los Angeles, San Francisco, and Sacramento Counties, but, as a rule, no prosecutions have been instituted, and, consequently, an indifference has arisen to the laws of health in many places where a few vigorous prosecutions for non-compliance with the law would have been followed by the most important results, in a sanitary point of view. We think that Health Officers are too indulgent in these matters, and permit neglect regarding the preservation of the public health to be practiced with impunity, whereas such neglect in regard to the preservation of the lives of horses or the welfare of cattle would be prosecuted vigorously.

HEALTH BOARDS AND HEALTH OFFICERS.

Complaint has been made that in some counties with towns of five hundred inhabitants and over the Supervisors have failed in their duty of appointing Health Boards or Health Officers. Unfortunately, these complaints have some foundation in fact, from the dislike of County Boards of Supervisors to add to the expenses of the county by appointing Health Officers whom they would have to pay. When they can get a physician who is content with the honor and asks nothing for his services, the appointment is made without any urging, and the Board considers it has done its whole duty in such cases. It is needless to say that unpaid work is never profitable to the community in which such arrangements are made. The position of Health Officer is one of the greatest responsibility; in his hands are the issues of life or death; upon his vigilance and watchful care depends the health or sickness of a

whole township; he must have an honest pride and interest in his calling, and must set aside the ties of blood or friendship where they interfere with the proper discharge of his duty. We are very frequently asked, as a Board, to define the duties of a Health Officer, or what is expected of him, the amount he ought to be paid, etc.

To these inquiries your Secretary has replied that in the broadest sense, the duty of Sanitary Boards and Sanitary Officers is to prohibit or abate whatever is unmistakably perilous to public health. The individual Health Officer should in the first place put himself in friendly relations with the physicians of the district in which he is situated, cultivate their esteem and respect, not as antagonistic to their welfare, but as a common helper in the cause of humanity and health. The Health Officer should make it his business to ascertain the location of every infectious disease within his jurisdiction, then place a distinctive sign upon the premises that such and such a disease is in the house; but before he can do this, he must have the Supervisors or the Town Trustees pass an ordinance requiring all houses harboring any infectious disease, such as smallpox, diphtheria, scarlet fever, etc., to bear a distinctive flag or card of warning to the public that such a disease exists. It is the duty of the Health Officer to then ascertain as accurately as possible the source from which the disease has been derived. If the cause is local, have it remedied or removed, and see that the place infected is thoroughly disinfected when the disease has abated. It is also the Health Officer's duty to make periodical inspections of the water supply of the town, and where pollution is likely to occur from the proximity of privies, to have them removed, their sites disinfected and filled up with dry earth. It is his duty also to see that all streets, alleys, and back yards are kept in a sanitary condition, and all accumulated filth removed and destroyed. It is also an important duty of the Health Officer to see that the food supply of his people is fresh and healthy, and no diseased meat be permitted to be sold; he must also supervise the burial of deceased persons, and see that none are interred without first procuring his permit, which must be transmitted to the Recorder by the person receiving it. He thus contributes to the general stock of knowledge with regard to the sanitary condition of the people, and the preventable causes of sickness and mortality, which, when collected and published in the Biennial Report, may guide the Legislature in the extension and amendment of sanitary laws. All these duties, properly performed, take time, education, and experience, and should not be expected without adequate compensation.

We regret to say that many of our Health Officers have been asked to give their services for the honor of holding the office, and a majority get the smallest recompense a miserly Board of Supervisors can bestow. In many counties containing many towns with over the population required by law, the authorities have appointed neither Boards of Health nor Health Officers, for the reason that they think it is putting the county to a needless expense, utterly regardless of the many lives it would save from ordinarily preventable disease, or the greater expense involved should an epidemic occur through their criminal negligence. The beneficent efforts arising from properly organized Boards of Health cannot be more conclusively shown than appears in the death rate in England and Wales during the past seventeen years. In the twenty largest English towns, as noticed in an address by Dr. A. Hill, before the Section on Hygiene at the meeting of the British Medical Association, he demon-

strates that the death rate has fallen from 24.4 to 19.0 per thousand. While taking certain individual communities, we find that in London the death rate has fallen from 22.5 to 17.4; in Liverpool, from 25.9 to 21.6; in Birmingham, from 24.8 to 18.4; in Salford, from 29.3 to 20.3; in Bristol, from 23.1 to 17.6; and in Maidstone, in the same time, it has declined from 22.8 to 13.7. Calculated to percentages, the diminution of the general mortality for England and Wales is 15.6 per cent, and for the twenty large towns it is 22.1 per cent; for London, 22.6 per cent; for Liverpool, 16.6 per cent; for Birmingham, 25.8 per cent; for Manchester, 20 per cent; for Sheffield, 19 per cent; for Salford, 30 per cent; for Maidstone the diminution in the death rate has attained the extraordinary figure of 40 per cent.

These results teach a lesson that should be impressed upon the mind of every sanitarian, encouraging him in the fulfillment of his duty to the public, and should not be forgotten by public officials or those opposed to active sanitary measures as unnecessary, because the immediate result is not at once apparent. In our own State our statistics are not sufficiently complete to draw any deductions as to the saving of life effected since our local Boards have been organized. We are yet too young in sanitary organization to demonstrate satisfactorily what we have accomplished, but what has been done in Europe can as most assuredly be done here, and we can look forward to the diminution of our death rate henceforward with as much certainty as we can to any problem depending upon organization for its solution.

As Dr. Hill says: "Two hundred years ago if any one predicted that the then death rate of eighty per thousand in London would be reduced to twenty, his statement would have only excited ridicule. If so late as 1873 the prognostication had been made that the sanitary activity then commencing would result in the comparatively short period of seventeen years in a reduction of the death rate in the twenty large English towns to the extent of 22 per cent, and that of Salford to the extent of 30 per cent, or of Maidstone of 40 per cent, such a forecast would have been thought visionary; yet these magnificent results are now accomplished facts. But," he says, "it cannot be supposed that the limit of improvement is reached, that the resources of preventive medicine are exhausted; on the contrary, there is good reason to believe that almost, or quite as much, remains to be done as has already been accomplished."

These encouraging facts should be incentives to our Board to continue its good work with renewed zeal. We must importune the Legislature to grant us such power that every hamlet will have its Health Officer, and every town its Board of Health. With the grand results achieved in the Old World by well directed sanitation, is there any reason why we should allow hundreds of valuable lives to be sacrificed yearly which might have been saved by preventive medicine? Or is there any reason that diphtheria, scarlet fever, or typhoid germs should be allowed to scatter their seeds of death through a village or town, that the fragmentary portion of a dollar might be taken off our taxes, and hundreds added to our expenses in caring for the sick, or giving them interment, to say nothing of the widows' tears, or the orphans' cries, or the bereaved homes of those whom we have thus allowed to be criminally murdered, to save an expense that is more necessary to the welfare of the people than any other expenditure incurred by municipal or county authority? In the face of all statistics to the contrary, the prejudice existing in the minds

of many County Supervisors and many City Trustees against the utility of Boards of Health, Health Officers, and sanitation in general, can only be attributed to ignorance of the subject upon the part of these objectors. They require education upon the law that decrees that without cleanliness health is impossible; that disease is not a natural law of mankind, and that wherever it exists, in the large proportion of cases, it is the result of violation of natural law, and the indifference, apathy, or ignorance of man to his surroundings. In a not very distant city there lives now a gentleman who built himself a fine new mansion in close proximity to a city cemetery. Within fifty feet of the cemetery fence he sunk his well, and from it draws all the water for stock and culinary purposes, evidently utterly ignorant that such water must contain the putrid juices draining from the decomposing bodies in its vicinity, and positively dangerous to the health of man or beast. If such a man lost his family or was killed himself by any infectious disease, it would immediately be laid to the dispensation of Providence, or anything else, except to the owner's ignorance of hygienic law or observances.

In conversation with a Supervisor, one day, upon the necessity of appointing a Health Officer in a certain town, he said: "What is the good of a Health Officer; we have no sickness here and have had none; why should we go to the expense of paying a man when there is nothing for him to do; wait until some epidemic breaks out, and then we will appoint a man right away." Now this was apparently an intelligent man, yet he could not see the value of prevention; he could not see that the expenditure of a few hundred dollars in investigating the likely sources of disease was cheaper than spending thousands of dollars in arresting a disease that might be fatal to many of the best citizens of the place before its march could be arrested. To deal with such intellects reason is powerless, and in such cases the State Board of Health needs compulsory power to establish Health Officers and Health Boards whenever such organizations are necessary for the protection of the public health.

STATE ANALYST.

In this connection it might be stated that our Board is at a great disadvantage in regard to our State Analyst. The law appointing a State Analyst neglected to appropriate any funds to enable him to employ the means of making analyses, in the way of proper assistants; the duties otherwise of the State Analyst being so numerous and exacting that he cannot possibly devote the time necessarily required in making chemical investigation of our mineral springs, adulterated foods, etc., without further help, and this cannot be had without compensation. As a consequence, our mineral springs are still unanalyzed, and adulterated articles of food are still upon the market, as our Board has no means of having them investigated. At the last meeting of the Legislature your Secretary had the sum of \$5,000 inserted in the "Appropriation Bill" for the use of the State Analyst, to enable him to employ for two years the assistance necessary to give that attention to our mineral springs and our food supply which the law contemplated when it created the office. When the appropriation bill was reported by the committee to the Senate, with the clause appropriating "\$5,000 for the use of the State Analyst for two years, to enable him to employ

such necessary assistance as he might require in analyzing the mineral springs of the State, or the adulterations of its food supply," it was stricken out upon the motion of a Senator, who thought "it was a useless expenditure of the people's money, and if they wanted their springs analyzed, or their food supply examined, to do it themselves." This argument was sufficient to defeat the proposition, and, as a result, we are still in ignorance of the medicinal value of our springs, or of the extent to which our food supplies are adulterated. The State Analyst is at present in Europe, and favored with credentials from our Board, will attend the International Medical Congress in Berlin, where he expects to derive some valuable information in sanitary matters, which he intends to impart to this Board in the form of a report, which he will prepare for publication upon his return.

The necessity of having an official analysis of the different mineral springs of this State is becoming more urgent every day; few days elapse that we are not applied to for information upon this subject from every part of the United States, and it is humiliating to have to reply that no official analyses of any of the springs have yet been made. It is incumbent, therefore, upon our Board to leave no means untried to have our coming Legislature appropriate at least \$5,000 for this purpose. With this sum our Analyst thinks that he can employ such assistance that in two years he will have all the principal mineral springs classified and analyzed, and thus enable us to give definite and reliable information to those seeking health at these resorts. It is believed that numerous articles of food supplies in our markets are adulterated, and that an analysis would soon declare the truth or falsity of such belief. The charge of wasting the public funds in the ascertainment of such facts is the most diaphanous that could be brought against the appropriation. Health has a money value outside every other consideration, and of so much importance is the factor of health in the general progress of industrial and business interests, that the most cordial coöperation should enlist itself in the support of all agencies designed in its promotion; instead of wasting public funds the employment of State money for such purposes is adding wealth to the community. It is asking funds to develop this wealth by unfolding an agency whereby health will be promoted; the business interest of every community should enlist itself in this cause, and lend its support as a profitable investment. We trust at the coming meeting of the Legislature this appropriation will be made, and its necessity commend itself to our legislators.

SMALLPOX.

During the legislative session of 1887, smallpox was epidemic in Mexico; it crossed our southern border and commenced its travels northward. Your Board having no funds at its command to take any preventive measures for its arrest, appealed to the Legislature for a contingent fund, to be placed at the disposal of the Governor, to be used at the discretion of the State Board of Health. An Act was accordingly passed appropriating the sum of \$10,000 for the use of the Board. With a portion of this fund we appointed Inspectors at all points threatened by an invasion of the disease, with gratifying success. Later, your Board deemed it advisable to send a delegate to the National Conference of State Boards of Health, to devise some means whereby an interstate

notification of disease might be established. This was agreed upon, so that now we are forewarned of any epidemic disease that may arise in any State with which we are in unison. During the present year we were apprised of the fact that smallpox in a severe form was again prevalent in Mexico, and to ascertain its limits and locality, your Board appointed a Medical Inspector to visit the infected places and report our danger. In this he was materially aided by the United States Government appointing our Inspector as their Inspector, thus giving him the power to take such precautionary measures in the Territories of New Mexico and Arizona as he might deem necessary. After a month's close inspection and examination of all the infected places, your Inspector reported that the danger to our State was not now imminent, but that as winter approached we might expect a fresh outbreak of the disease, and must be prepared to resist the invasion by quarantine measures. The doctor's report will be placed before you hereafter.

LEGISLATION.

Your Board at this time deemed it prudent to send a delegate to Nashville to represent us at the meeting of the National Conference of State Boards of Health, to obtain its views upon certain interstate sanitary matters, and also to devise some methods by which the purity of our potable waters might be preserved. His report is herewith appended. These various sanitary precautions had to be paid for out of our contingent fund, provided to prevent the introduction of contagious and infectious disease. The sums expended since 1887, or during the past three years, amounted to \$4,017 55, leaving a balance to the Governor's credit of five thousand and odd dollars. This, in case an epidemic of smallpox breaks out in Mexico or along our southern border, will not be sufficient to carry us for the next two years as, we may have to quarantine against cholera, which now threatens to invade our coast. It would, therefore, be prudent to seek through the Legislature a replenishment of our contagious disease fund, in order to be prepared for any emergency that may arise. The present fund has been so judiciously and carefully expended that the Legislature may be inclined to think that enough of the fund remains to give us all the protection necessary. If we could be sure of no greater need in the future than there has been in the past, it is probable that we have enough, but if unfortunately we had to place Inspectors at every inlet to the State, the present fund would go but a short way in accomplishing the sanitary measures needful to ward off infectious disease that threatened us at every point. We would therefore ask that our claim be placed in the appropriation bill as one necessary to the sanitary welfare of the State. As your Board is aware, during the last session of the Legislature we had several bills before that body amendatory to our health laws. Of these we succeeded in passing a law making vaccination compulsory on all children attending the public schools of the State, which reads as follows:

AN ACT

To encourage and provide for a general vaccination in the State of California.

[Approved February 20, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated; *provided*, that any practicing and licensed physician may certify that the child or person has used due diligence and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this Act.

SEC. 2. The Trustees or local Boards, annually, or at such special times to be stated by the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

SEC. 3. The said Trustees or Boards must within sixty days after the passage of this Act, and every year thereafter, ascertain the number of children or persons in their respective school districts or subdivision of the city school government being of an age suitable to attend common schools, who have not been already vaccinated, and make a list of the names of all such children or persons. It also shall be the duty of said Trustees or Boards to provide, for the vaccination of all such children or persons in their respective school districts, a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated. And when so vaccinated to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section one.

SEC. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town. And if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the County Treasury for the use of the district.

SEC. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and seventeen years who are vaccinated and the number unvaccinated.

SEC. 6. This Act shall take effect immediately.

This law, as before remarked, was held in abeyance until a test case was taken to the Supreme Court to determine its constitutionality. This being given in favor of the law, we will now have it enforced throughout the State, and thus assure the vaccination of the present generation of school children, to the great protection of the State. The next law that we were enabled to pass was the important one establishing Boards of Health and Health Officers, which we have before quoted. Another equally important measure relating to the interment of human bodies was passed by the Legislature, and approved by the Governor, as follows:

AN ACT

To amend section three thousand and eighty-four of an Act entitled "An Act to establish a Political Code," approved March 12, 1872, relative to the interment or cremation of human bodies.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and eighty-four of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, is hereby amended so as to read as follows:

Section 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit therefor. In incorporated cities, or counties, or cities and counties, the permit must be obtained from

the person authorized to grant the same by any law, ordinance, or resolution passed for that purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a permit must produce and file with the officer issuing the permit a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth, as near as possible, the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code; but if any other registration of the death of the deceased shall have been made, the Recorder must record the name but once.

SEC. 2. This Act takes effect thirty days after its passage.

This Act, when properly enforced, will enable your Board to get a very complete list of all the deaths and their causes in California. As you have heretofore seen, it is not as effective as it will be by a little supplemental legislation, which we contemplate this winter. The last law that we succeeded in getting passed, was an amendment to the Penal Code, making it a misdemeanor to violate any of the laws relating to the preservation of the public health, which reads as follows:

AN ACT

To amend section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February 14, 1872, relating to the disposal of human dead bodies, and preservation of the public health.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 377. Every person who is charged with a duty relating to the registration of deaths, under chapter three, title seven, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,

2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,

3. Willfully interrs, cremates, or otherwise disposes of any human body in any city, county, or city and county, without having first obtained a permit, as provided for in said chapter; or,

4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,

5. Willfully violates any of the laws of this State relating to the preservation of the public health;

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

Under this Act we are enabled to prosecute violators of the law. Its weakness lies in the wording of the statute which requires the prosecutor to prove a *willful* violation of the law. This is almost an impossibility to do. The wording of the statute should be changed so that "*willfully*" may be expunged for the word "*knowingly*," or some other word expressing knowledge of the Act, without necessarily implying willfulness in its violation. We may congratulate the Board on its success in obtaining the foregoing amendments to its health laws. It is now incumbent upon us to supplement this legislation by the addition of the law which through misadventure failed to reach the Governor last session, and without which it will be impossible to collect such statistics as will make our report valuable in the matter of births, marriages, and deaths. The proposed law reads as follows:

AN ACT

To amend sections three thousand and seventy-seven, three thousand and seventy-eight, three thousand and eighty, and three thousand and eighty-two of an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relative to the registry of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and seventy-seven of said Act to establish a Political Code is amended so as to read as follows:

Section 3077. All persons registering marriages, births, or deaths, must, at the close of every calendar month, file with the County Recorder a certified copy of their register. Each certificate must certify, as nearly as may be ascertained, the name in full, age, occupation, term of residence in the city or county, birthplace, condition, whether single or married, widow or widower, sex, race, color, last place of residence, and also, when of accidents, the cause of death; and also, when of births, the sex and color of the child, and name and nativity of its parents. Each person filing such copy is entitled to a compensation of twenty-five cents for each birth, marriage, or death, so recorded, and the Recorder must give a certificate of such filing to the person entitled thereto, stating the number of deaths, marriages, or births recorded, and the amount due therefor. Upon the presentation of the Recorder's certificate to the County Auditor, he must deliver at once, without any order of the Board of Supervisors, a warrant for the sum due, payable out of the General Fund of the County Treasury, and the County Treasurer is directed to pay the same. The Auditor must report the amount of warrants so drawn each month to the Board of Supervisors.

SEC. 2. Section three thousand and seventy-eight of said Act entitled an Act to establish a Political Code is amended so as to read as follows:

Section 3078. If, at any birth, there is no attending physician or midwife, the parents must make the report, and are entitled to the same compensation prescribed in the preceding section.

SEC. 3. Section three thousand and eighty of said Act to establish a Political Code is amended so as to read as follows:

Section 3080. The County Recorder, at the close of each month, must transmit to the Secretary of the State Board of Health, at Sacramento City, a certified abstract of the register of births, marriages, and deaths, prepared in the manner prescribed by the Secretary, and upon blanks furnished by him.

SEC. 4. Section three thousand and eighty-two of the Act to establish a Political Code is amended so as to read as follows:

Section 3082. Any person on whom a duty is imposed by this chapter, who fails, neglects, or refuses to perform the same, is liable to a penalty of fifty dollars and costs of suit for each offense, to be recovered in an action by the District Attorney of the proper county; one half of the penalty to be retained by him for his services, and the remainder to be paid into the General Fund of the county. The Secretary of the State Board of Health and the County Recorder must inform the District Attorney of any neglect of duty as prescribed in this chapter.

SEC. 5. This Act takes effect thirty days after its passage.

Had this law been transmitted to the Governor upon its passage, instead of being allowed to lie upon the Secretary's desk, our work for the past two years would have been more complete. This law removes the objection of all persons registering deaths, births, and marriages, viz.: that they get no compensation for their trouble. This has been the most prolific source of complaint. Persons say that they will not do the business of the State without being paid for it; that if the State considers it worth its while to collect and tabulate its vital statistics, it should be willing to pay for the service rendered. The bill here presented provides against this objection, by giving a compensatory fee of 25 cents for every birth, marriage, and death recorded. This will insure the registration of nearly all births, deaths, and marriages, and give us a legal record upon the Recorder's books, which will be invaluable for future reference. Supplementary to this, your Secretary presented an amendment to the Penal Code, which was introduced by Hon J. M. Briceland, advocated, and passed by him in the Senate, as follows:

AN ACT

To amend section three hundred and seventy-eight of an Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, relating to the preservation of the public health and safety and registration of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-eight of the Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 378. Every person charged with the performance of any duty under the law relating to the public health, and every person charged with the duty of keeping a register of births, marriages, or deaths, and every Recorder, or other person, whose duty it is to report to the State Board of Health, who willfully neglects or refuses to perform the same, and every person who willfully refuses to obey the rules and regulations passed by any Board of Health, or Health Officer having the powers of a Board of Health, is guilty of a misdemeanor.

When transmitted to the Assembly it received a second reading, but by some misunderstanding it never reached a third reading, and as a consequence failed to become a law. If this amendment to the Code had passed and received the Governor's signature it would have brought the registration of births, marriages, and deaths under the operation of the Penal Code, and consequently increased our power in compelling the observance of the law. This amendment to the Code should be again introduced this coming session of the Legislature, as it is of the utmost importance that your Board be enabled under the law to enforce the provisions for the collection of the vital statistics of the State. We would, however, again suggest that the word "knowingly" be substituted in the Act for the word "willfully," which, as before stated, makes conviction almost an impossibility. We were, however, very much gratified in obtaining what legislation we did, as it evinced a desire upon the part of the Legislature to acquiesce in the request of your Board for a change in our health laws, and an appreciation of the fact that your Board was working in the interest of the State, and not for individual benefit.

SANITARY INSPECTOR.

In the latter part of the session a bill was introduced by our member, Senator J. M. Briceland, providing for the appointment of a State Sanitary Inspector, whose duties, in part, should consist in visiting all portions of the State wherever or whenever contagious or infectious disease was reported. To visit and inspect periodically our southern border along the Mexican line, or other parts of the State likely to be the inlet of contagious disease. This bill was introduced so late in the session that it was an utter impossibility to procure the necessary formalities before it could become law. The appointment of such an officer seems a necessary adjunct to the State Board of Health in the best interests of the State. His duties, in addition to the above, would embrace a general diffusion of sanitary knowledge among those who, from carelessness or indifference, allow preventable disease to progress unchecked. His services would be invaluable in visiting each town having the necessary qualifications in population for an organized Board of Health, or having a Health Officer therein. He should also be prepared to give short practical lectures upon public and private hygiene; inspect the water supply, the disposal of garbage, the sewerage and drainage of every place visited. He should also visit and inspect the jails, court houses, churches, and places of amusement, regarding their ventilation, heating,

etc., in connection with all other matters appertaining to the sanitary welfare of the people. He should also be prepared to test the milk supply, to see that the animals supplying it were healthy, and the dairies kept in that state of cleanliness that would insure, as far as possible, freedom from contamination by decomposing filth.

Our sanitary progress would proceed with more rapidity if we had such an officer, one who was a sanitarian from conviction, and one who would take an interest in carrying his convictions to the people interested. A few years of missionary work of this kind would make such a lasting impression by the good accomplished, by the improvement in the sanitary condition of the places under supervision, and by the decreased mortality, that thereafter but little trouble would be experienced in establishing cordial relations and coöperation with the State Board of Health, and be accompanied by such an advancement in sanitary science throughout the State, that we might claim a prominent place among those States that are noted for the watchful care bestowed upon the preservation of the public health.

STATE VETERINARIAN.

Another bill was introduced into the Senate, providing for the appointment of a State Veterinarian, which passed both Houses, but was refused signature by the Governor, as the bill provided that the appointment of the Veterinarian should devolve upon the State Board of Health as the proper officers to determine the qualification of the applicants for the position, and their ability to make the necessary pathological and microscopical investigations required by the bill. This bill would have been of great benefit to the State, as it gave the appointee the power of inspecting all cattle, or other animals supposed to be diseased, and made it his duty to visit any locality where such diseased animals were reported to exist. It also made it the duty of all persons knowing, or having cause to suspect the presence of contagious disease, to notify the State Board of Health of the existence of such disease, and upon its verification by the State Veterinarian, he was authorized to quarantine such animals, and call upon Sheriffs, Constables, and peace officers to aid and assist him in so doing. At the same time, the following bill was introduced to regulate quarantine:

AN ACT

To regulate quarantine, and the admission of horses, cattle, sheep, and swine into the State of California from infected districts.

[Approved March 19, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The State Board of Health shall be empowered to declare quarantine against the entry of domestic animals from any State or Territory, or any foreign port or country, in which contagious or infectious diseases are known to exist; said infected parts to be named in the proclamation.

SEC. 2. All domestic animals coming into the State from districts mentioned in section one must be required to enter the State at such points only as the State Board of Health may by proclamation determine, and designate where they must be unloaded for inspection.

SEC. 3. All owners of domestic animals coming into this State from localities quarantined against will be required to furnish the following evidence that such animals are free from disease:

First—The affidavit of two disinterested parties, who have known such animals for a period of four months prior to the date of shipment, that they have been healthy, and

exposed to no contagious disease, and that no contagious disease is known or believed to exist in the district or country from which they came.

Second—The certificate of the County Clerk of the county, that persons making such affidavit are responsible and reputable citizens of the county.

Third—The affidavit of the owner or person in charge, made at the point of entry, that such domestic animals are the identical animals described in the foregoing affidavits, and that shipment has been direct, and without unloading, except for food and water, and in cleansed and disinfected cars.

SEC. 4. Owners or persons in charge of domestic animals from localities not named in such proclamation must certify, under oath, that such domestic animals have been kept in one place for a period of four months immediately preceding the date of shipment (giving the name of the town and county and State, Territory, or country), and have not been exposed to any contagious disease for a period of three months prior to the date of shipment.

SEC. 5. All the foregoing evidence to be submitted to the State Veterinarian, or an authorized Inspector of the State, when permits for shipment in this State shall be issued.

SEC. 6. Dealers' calves gathered in quarantined States or Territories will be quarantined at the points of entry.

SEC. 7. Domestic animals not receiving permits for shipment, and retained in quarantine, will be held at the owner's risk and expense.

SEC. 8. All domestic animals arriving at points of entry shall be inspected free of charge to the owner.

SEC. 9. No railway company doing business in this State shall receive for shipment into this State any domestic animals, unless accompanied by a permit signed by an authorized Inspector.

SEC. 10. No cattle shall enter this State from Texas, New Mexico, or Mexico for grazing purposes during the months of March, April, May, June, July, August, September, October, and November in each year.

SEC. 11. All cattle from those parts mentioned in section ten entering this State during the months mentioned in section ten, and intended for butchering purposes, shall pass from the point of entry into the slaughter house yard, which yard shall be specially constructed and isolated for the purpose of receiving such stock. The stock shall be unshipped in said yard direct from the cars running into the yards for that purpose.

SEC. 12. Said cattle shall, moreover, be shipped in specially constructed cars, which will prevent the dropping of manure and urine on the track during transit, and after unshipping such cattle the cars shall be thoroughly disinfected with carbolized white-wash.

SEC. 13. All cattle entering this State for the purposes mentioned in section eleven shall only be unshipped between the point of entry and destination at places set apart by the State Board of Health in its proclamation; and no native stock shall be allowed at any time to enter said places; said places shall be, moreover, thoroughly disinfected in such manner as the State Board of Health may direct.

SEC. 14. Any person or persons, corporations, or firms, who shall violate any of the provisions of this Act, shall be liable for all damages sustained and a fine of one thousand dollars, to be recovered in any Court of competent jurisdiction, on account of any contagious or infectious disease being communicated from any diseased animal to any other animal in the neighborhood, or along the line of such transportation of such diseased animals into or through this State, or from one part thereof to another; and the existence or presence of such contagious or infectious disease among the native cattle of this State on the same ranch with, or in the vicinity of any such diseased animals, or along the line or route over which they were transported, shall be prima facie evidence that the same were affected with such disease at the time of being so removed or transported, and communicated it to such native domestic animals so affected therewith.

SEC. 15. The words "domestic animals" whenever used in this Act shall be construed to mean and include horses, mules, asses, cattle, sheep, goats, and swine.

SEC. 16. The State Board of Health is hereby authorized to appoint one Inspector for each of the points of entry by railroad communication into this State, who shall reside at such point as may be designated by the State Board of Health, and shall receive such compensation for actual services as may be determined by said Board, not to exceed one hundred dollars per month; such compensation to be paid out of any moneys in the State Treasury not otherwise appropriated, upon the warrants of the Controller of State drawn upon the certificate of the State Board of Health allowing the same.

SEC. 17. This Act shall take effect immediately.

This bill passed the Senate, and was supposed to have passed the Assembly. It was transmitted to the Governor, received his approval, and was placed among the statutes of the State. After the Legislature adjourned, it was discovered that this bill had not legally passed the Assembly, and consequently was null and void; and although it is printed among the laws of the land, it cannot be enforced; consequently the State is still without any official means of either detecting diseased

animals or taking measures to arrest the spread of contagious diseases among animals if detected. This omission ought to be rectified at the next meeting of the Legislature, as splenic fever is quite common in this State, and tuberculosis is known to exist in many of our dairies. A State Veterinarian and a State Sanitary Inspector are necessary adjuncts to the State Board of Health.

QUARANTINE.

Upon the subject of quarantine as applied to our seaports, your Secretary has to report the following letter from Supervising Surgeon-General Hamilton, which shows that work is in contemplation upon the grounds in San Francisco Bay and San Diego. Since the receipt of this letter, work has been begun in San Francisco Bay, and it is hoped that the station will be prepared for service before the completion of the present year:

TREASURY DEPARTMENT, OFFICE OF THE SUPERVISING SURGEON-GENERAL, }
U. S. MARINE HOSPITAL SERVICE, WASHINGTON, March 7, 1890. }

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento, Cal.:

DEAR SIR: In reply to your letter of the twenty-fourth ultimo, I have to inform you that plans and specifications for the United States quarantine plant, at Angel Island, San Francisco Bay, have been completed, and contract has been made by the Supervising Architect of the Treasury for the construction of necessary buildings, wharf, etc., which will be begun at once. With regard to San Diego, I have to state that there has been unavoidable delay in obtaining a proper site, caused by the refusal of the War Department to transfer to this Bureau the portions of the Government reservations which had been selected by a Board appointed for that purpose.

A good site, however, has recently been acquired by purchase, and pending preparations of plans, and making of contract for the erection of buildings, a medical officer is kept on duty continuously, and a quarantine inspection is constantly maintained. Should emergency arise, temporary measures, such as erection of tent hospitals, temporary detention, and disinfecting apparatus, will be provided.

The contract provides for an expenditure of over \$112,000 for buildings and appliances alone.

The boarding vessels required for San Francisco and San Diego quarantines must be built on the Pacific Coast, and must be provided for by a special appropriation of Congress; and the coöperation of your Board to this end is desirable.

Respectfully yours,

JOHN B. HAMILTON,
Supervising Surgeon-General, M. H. S.

In case of the incursion of infectious disease, such as smallpox, yellow fever, or cholera, by way of Arizona or Mexico, it would be necessary for our Board to select a quarantine ground in the valley of the Rio Grande, or in its vicinity, which would be accessible to water, away from human habitations, and yet within easy communication by railway. Such a location can, in the opinion of Dr. Herrick, be found in a place called Carbazon, ninety-three miles east of Los Angeles, as will be seen in Dr. Herrick's report introduced later. Our State, since the last Biennial Report, has been singularly free from epidemic disease, and the endemic diseases that prevailed were generally of a mild character, and without any remarkable fatality.

SMALLPOX.

A few cases of smallpox appeared in California during the fiscal year of 1888; one case was reported in July. In August, some fourteen cases were reported in hospital in San Francisco, two in Oakland, and one in Redding, Shasta County. In September, San Francisco reported twenty-

four cases in hospital, Stockton one case, one in Livermore, and one in Elk Grove. In October a case appeared in Sacramento; the disease had not increased in San Francisco. In November, there were thirteen cases in San Francisco, in Santa Rosa there were four cases reported, and in Merced there were five cases reported.

In connection with these cases it might be said that at the first outbreak a difference of opinion existed among the medical men there as to whether the disease was smallpox or varicella. To settle the difficulty, I requested our fellow-member, Dr. C. A. Ruggles, who has had great experience in the disease, to visit Merced and report, which he has done, as follows:

During the last days of November, 1888, I received a telegram from Dr. Tyrrell, Secretary of State Board of Health, requesting me, at my earliest convenience, to go to Merced and investigate a suspicious case of sickness. On the following day I took train, arriving at Merced at half-past 2 o'clock P. M. I put myself in communication with Dr. G. P. Lee, the attending physician. I much regretted the unavoidable absence of Dr. E. S. O'Brien, who had seen the suspected case in consultation with Dr. Lee; but my limited time would not permit my awaiting the return of Dr. O'Brien, so we repaired to the home of the patient. I found a lady advanced in years, a relative and neighbor to a child that died but a short time before, afflicted with a "breaking out" on the skin. She had been a constant attendant on the deceased and other members of the family who had been similarly affected. Having been assured by many that there was no occasion for any suspicion, I determined to be exceedingly careful in my investigation. Upon bringing a good light to bear upon the eruption on the old lady, I found the unmistakable, genuine marks of variola in the "drying up" stage, and I unhesitatingly pronounced it a case of varioloid, as she had been successfully vaccinated in years ago, and that she had probably contracted the disease from the child who had died, and had been buried publicly only a few days before, with the attendance usual in a country town of the size of Merced. I gave a written opinion to the District Attorney, J. W. Breckenridge, advising that a special meeting of the Board of Supervisors be called, that a Board of Health be appointed with full power of action, that a rigid quarantine of the affected person be enforced, that general vaccination be performed, as I much feared that the error in diagnosis might be very serious in its effect. I was very well satisfied where this lady contracted the disease, but where the child and the others previously affected contracted it, I am not able to say.

With some of the county officials and Dr. Lee and Dr. O'Brien, who had returned to town, I made a rigid examination of Chinatown, as it was supposed there might be some secreted cases existing there. I found nothing on which to base a supposition where the first cases originated. I was satisfied that all to whom I had expressed my opinion did not believe that there had been a serious error of diagnosis, and it was fortunate for my peace of mind that I did not know anything of the newspaper war that was waged against my opinion, and the action of the Board of Supervisors based upon that opinion. I presume that all the advised precautionary measures were thoroughly carried out. To confirm and verify my opinion, twelve days after my visit I received a telegram from District Attorney Breckenridge requesting me to send a few female nurses to attend smallpox cases. Fortunately I had at my command three faithful, competent, and experienced lady nurses, whom I sent on the following day to the assistance of the Board of Health.

My own personal knowledge of the smallpox at Merced ceases here, and is respectfully reported.

C. A. RUGGLES, M.D.,
Of State Board of Health.

About one week after Dr. Ruggles' visit a controversy had arisen between some of the inhabitants and the doctors, the former doubting the correctness of Dr. Ruggles' opinion, and your Secretary was requested to visit Merced, and definitely settle the matter. Accordingly, I went down, visited all the patients, examined them carefully, and gave a written opinion confirming most fully the conclusions arrived at by Dr. Ruggles, that the disease was smallpox. This seemed to satisfy the controversialists, and renewed sanitary precautions were immediately instituted.

In December, two cases of varioloid appeared in Los Angeles. In Mendocino one case appeared, likewise one in Stockton. In San Francisco there were three or four cases during the month. In January,

1889, there were cases of smallpox still developing. San Francisco had a few; ten were reported in the first part of the month; a case was also reported in Napa County, three new cases in Merced, two cases occurred in Riverside, near San Leandro other cases developed. Your Secretary was also called to Placerville to see a case of well marked confluent smallpox, which was, no doubt, contracted from a case that had died there some time before. A case of varioloid also developed some little distance from the town. In February, the disease began to abate; only one case occurred in San Francisco. In Placerville five cases occurred during the month, one case was reported in Stockton, and one in Truckee. In March, San Francisco reported three cases, and three occurred in Hanford. In April, only one occurred in San Francisco and one in Hanford. In May, three cases occurred in San Francisco, one in Lodi, and one in Stockton. In June, no cases were reported in California.

From this date the disease remained absent from the State until October, 1889, when Dr. Baum, of Placerville, reported two cases of varioloid about seven miles from Placerville. They came from Carson Valley, Nevada. The disease did not extend. In November, one case was reported in Humboldt County. Since then there has been no smallpox in the State. During the month of May, in the present year, alarming accounts were received of the prevalence of smallpox in New Mexico, and along the line of the Southern Pacific and Santa Fe Railways. As these two highways into California were more likely to carry refugees into our State rather than into the East, and as it was impossible to obtain the exact seats or foci of disease from the conflicting reports forwarded, your Board deemed it advisable to appoint an inspector to visit all the infected districts, and take such precautions as he deemed prudent to prevent the carriage of the disease to this State. As our jurisdiction did not extend beyond the borders of California, and as it was important that measures should be adopted outside of the State, your Secretary telegraphed to Surgeon-General Hamilton the fact of smallpox being in New Mexico, and perhaps in Arizona, and asked him to appoint Dr. S. S. Herrick, our Inspector, as Inspector for the United States Government, with power to act. This Surgeon Hamilton promptly did, thus clothing our Inspector with authority to travel through the Territories, and carefully determine what was necessary to confine the ravages of the disease within bounds.

Herewith is appended the official report of Dr. Herrick, which proves that your Board acted with prudent foresight in thus having authoritative information upon the location of smallpox in the Territories, and the precautions which must be adopted if we desire to prevent another visitation of this most unwelcome pestilence:

SAN FRANCISCO, July 15, 1890.

Dr. G. G. TYRRELL, Secretary of the California State Board of Health:

SIR: On May twenty-fourth I received the following notification: "By the authority of the State Board of Health you are hereby appointed Medical Inspector on the line of the southern border of this State, to prevent, as far as possible, the inroad of contagious or infectious diseases from neighboring territory into California."

In compliance therewith I started the following day, and stopped for a few hours at Los Angeles for consultation with Dr. Orme. It was decided first to visit the points where smallpox had been reported to prevail, and make a thorough investigation; then to report and await orders for the proper action. Accordingly, I proceeded to El Paso, satisfying myself by inquiries en route that no smallpox existed on the line of travel.

Arriving at El Paso, May twenty-eighth, I called on Dr. W. M. Yandell, who is the efficient City Physician and Health Officer of that place. He has resided there since 1886, and states that few cases of smallpox had occurred from that time to December, 1889. De-

ember fourteenth the first case was discovered at El Paso, but it had existed earlier at the opposite city of Juarez (Paso del Norte). Between December 14, 1889, and April 11, 1890, when the last case originated, there had been twenty-nine cases, with six deaths. All had been sent promptly to the pesthouse, except a few guarded night and day at home at their own expense. The requirement of vaccination for admission to the public schools is strictly enforced. Besides, I found the sanitary condition of the city remarkably good.

We visited Juarez together and examined the mortuary records at the office of the city Judge. Between October 1, 1889, and May 28, 1890, there had been forty-eight deaths from smallpox, out of a total of two hundred and fourteen from all causes. The number of cases was unknown. The population of El Paso is about eleven thousand, while Juarez is supposed to have nearly the same. The last death from smallpox at Juarez had occurred May 7, 1890.

Anthony Station is on the Santa Fe Railway, twenty miles north of El Paso. May twenty-ninth I stopped long enough to learn that three Mexican children had died there of smallpox, the last one about three weeks previously. How many other cases had occurred was unknown.

Las Cruces is forty-four miles north of El Paso, and has an estimated population of twenty-five hundred, of whom about one third are Americans and two thirds Mexicans. December 20, 1889, a man reached here on horseback from El Paso in the first stage of smallpox, having probably contracted the disease at Juarez. He was visited during his sickness by Mexican women with their infants in arms; for it seems to be the custom of those people to give their children smallpox at the earliest opportunity, instead of resorting to vaccination. From this beginning the disease continued to spread, but did not attract the attention of the authorities till April. As the town is not incorporated, the County Commissioners appointed one of the physicians Health Officer; but the law allows no compensation, and he declined the position. On May first the duty was assumed by a public spirited citizen, at which time there were sixty cases of smallpox. Nearly all were Mexicans, and their funerals were public from the church.

Mr. Booth, the acting Health Officer, could do no more than vaccinate those who were willing, display the yellow flag where the sick resided, and fumigate the houses. No public money was used for any purpose, except to purchase vaccine virus; the bovine supply failed of success in about half the trials. No account of cases or deaths was kept, but Mr. Booth estimated the total number of cases up to May twenty-ninth at one hundred and forty, with one third as many deaths. The total number then known to be sick was sixteen.

Mesilla is two miles from the railroad, and three miles southwest of Las Cruces. It has a population somewhat larger—nearly all Mexicans. Smallpox appeared there in April. I did not visit it at that time, and shall return to it later on. I learned that smallpox attacked the Texan ranchers among the Sacramento Mountains, ninety miles eastward of Las Cruces, in November, 1889, having reached there probably from Juarez.

San Marcial is a railroad town on the west bank of the Rio Grande, one hundred and fifty-one miles north of El Paso. Its population is about seven hundred—all American. In the winter of 1888-89, smallpox reached here from Socorro, and disappeared in April, 1889.

Old San Marcial is about one mile to the southwest, and has a Mexican population of about one hundred and fifty. Within the past six months three or four children have had the smallpox, the last case occurring about a month previous. At San Marcial I was informed that there were then two cases of smallpox at Cañada Alamosa, a Mexican town of about three hundred inhabitants, and about forty-five miles from Engle Station, which is one hundred and thirteen miles north of El Paso; and that some had occurred at San Alvaro, about thirty miles southwest of San Marcial.

Socorro is one hundred and seventy-eight miles north of El Paso, with a population of about one thousand five hundred Americans, and as many Mexicans. It is incorporated, but there is no registration of vital statistics, and no burial permits are required. Smallpox appeared in December, 1887, after an absence of two years. The last case occurred in April, 1890. Of Americans, there have been fifteen cases altogether, with four deaths. The number of Mexican cases was unknown, but conjectured to be at least seventy.

Magdalena is a town of about three hundred inhabitants, at the extremity of a branch railroad, thirty miles west of Socorro. Smallpox reached it in December, 1889, and five cases were known to have occurred. Visiting there later, I learned that there had been no cases for several months.

June twentieth, I learned that there was an American man sick with smallpox at San Antonio, a railway station twelve miles south of Socorro. It is, therefore, apparent that this part of the valley cannot yet claim riddance of the malady. Albuquerque is two hundred and fifty-four miles north of El Paso, and has an estimated population of six thousand, more than nine tenths white. The old town, about one mile and a half westward, has a population of about three thousand Mexicans. Within a radius of two miles there are probably twelve thousand inhabitants. In an interview with several of the medical men, their concurrent testimony was to the effect that smallpox had been almost constantly present among the Mexican inhabitants along this valley since 1881. Among the Americans the cases have been comparatively few. The last within the city limits were in June, 1889; but a month ago two occurred just outside on the south. Within the past year eight or ten cases have occurred at Bernalillo, sixteen miles north; and at Wallace, thirty-six miles north, four railroad people had the smallpox in 1889, besides about twelve others, mostly children.

In order to make the investigation as thorough as practicable, I traveled over the Atlantic and Pacific Railroad to Barstow, and thence by the California Southern to Los Angeles, stopping over night at Gallup, and making inquiries at the important points in New Mexico and Arizona. The most recent occurrence of smallpox was at the coal mines, three miles from Gallup, about eighteen months previously. The Mexican population is mainly found in the valley of the Rio Grande, and smallpox is their familiar and special companion.

While I was at Los Angeles, June seventh, a report of some cases of a suspicious eruption came from Pomona, thirty miles east of Los Angeles, with a request for an investigation by the State Board of Health. By desire of Dr. Orme, I went out the same day, and was taken by Dr. Burr to two Mexican settlements, where the cases occurred, just within the limits of San Bernardino County. Most of them had already recovered, and I saw only one presenting an eruption, which appeared to be varicella, rather than varioloid. Besides, I saw two young children, never vaccinated, in houses where members of the family had recently passed through this eruptive complaint. One of these children had experienced the same trivial eruption; the other had escaped altogether. It was therefore evident that the complaint was nothing more than chicken-pox. On consultation with Dr. Orme and the Secretary of the Board, it was then deemed advisable to return over a portion of the ground already traversed, in order to pursue inquiries at some points previously passed over, and to review the inspection of the principal seats of the disease. I stopped over one day, June thirteenth, at Yuma, where I met Dr. J. H. Taggart, who was inspector of railway trains for the California State Board of Health in 1887. The population of Yuma, Arizona, is about twelve hundred, one third Americans and two thirds Mexicans. The Yuma Indians, to the number of about fifteen hundred, live on the California side of the river, but visit the town in numbers daily. About ten years ago smallpox raged among the Indians along the Colorado, from Yuma to The Needles, but has not prevailed seriously since. At that time the Mojaves first, and the Yumas soon after, were persuaded to try vaccination, and they were so thoroughly convinced of its utility that they have requested its practice ever since.

Stopping over at Benson, Arizona, June fourteenth to fifteenth, I learned from Dr. J. C. Preston the particulars of smallpox there last winter. Early in December a resident returned from a visit to Chihuahua, Mexico, and within three days was attacked with smallpox. His wife and three children, and a neighbor who visited the house, followed in due time, but no more cases occurred. The County Commissioners authorized Dr. Preston to use all necessary measures, and the outbreak was suppressed at an expense of \$700. The population of the town is about three hundred, mostly Americans. This place has been fortunate, considering its exposed situation at the junction of a railway running southward through the Mexican State of Sonora, to have had only these six cases of smallpox in three years, as I was informed.

At Lordsburg, New Mexico, I was informed by Dr. Simpson, June sixteenth, that there had been no smallpox either in the town or at the mining camps within thirty miles for four years.

At Deming, the same day, I was informed that the only case of smallpox for a year was a tramp, who passed through and had the disease at Silver City in December, 1889. I was told by Dr. J. W. Williams, who had just returned from a visit to Hillsborough, that there were then five cases of smallpox in that town, all but one Mexican. Hillsborough is the county seat of Sierra County, eighteen miles from Lake Valley, terminus of a branch line of the Santa Fe Railway from Nutt Station. From Dr. Stovall I learned that there were about sixty cases of smallpox at Corralitos, a Mexican town one hundred and seventy miles south of Deming, which is its nearest railroad point. The disease is supposed to have appeared about the middle of May, but it was probably earlier. Revisiting El Paso, June eighteenth, I learned that a negro man, who had come from Durango, Mexico, had been sent to the pesthouse June second. This was the only case since April twentieth.

At Juarez a death from smallpox had occurred June fifth, the only one since May seventh. Passing through Anthony again, June nineteenth, I was told that another case had been discovered a week before; also, that there were some cases at La Union, a Mexican hamlet seven miles west, across the river. The same day I was again at Las Cruces, and was informed by Mr. Booth that eighty-eight cases had come under his care since May first, all but four Mexicans. Ten were then known to be on the sick list, all Mexicans. Public funerals of smallpox decedents had ceased. According to law, an order had been issued forbidding intercourse with the sick, but it was disregarded, and no prosecutions had been made. This time Mesilla was visited, in company with Dr. B. E. Lane, of Las Cruces, and Dr. C. F. Race, of El Paso. The acting Health Officer stated that smallpox was discovered here about April fifteenth, and sixteen cases were known to be sick. He estimated the number of cases at forty-seven up to date. It is probable, however, that many of moderate severity at both these towns have not come to the knowledge of those whose duty calls them to display the unwelcome yellow flag. In any event, the mortality at Mesilla was very low, as there had only been one death since May thirty-first. While the fatality of smallpox among the Mexicans cannot be determined with any approach to precision, it appears to be less than among Americans who have not been vaccinated. This is explained by the fact that the former have been habituated to the malady for more than three hundred years, and have gradually been gaining tolerance through survival of the fittest, *i. e.*, the most resistant individuals.

Although the aspect of smallpox in the valley of the Rio Grande has been found less threatening than was apprehended, and not calling for any sanitary supervision of pub-

lic traffic at present, it is plain that there is nothing to prevent the epidemic from spreading from Las Cruces and Mesilla to other communities in that region. The territorial law gives municipal authorities ample powers to deal with contagious diseases, but it is fatally defective in declaring that the Health Officers appointed by County Commissioners shall receive no compensation.

The County of Doña Ana has money in the treasury, and the physicians of those two towns properly believe that the laborer is worthy of his hire. The Legislature is not likely to correct the defect, if the doctors accept the duty and work for nothing. There is no probability that the epidemic will die out this season, for there is plenty of the raw material to last for many months, and the return of cold weather is likely to give it renewed vigor. It is now a proper field for a skilled sanitarian, with aptitude for persuading the local authorities to appropriate money to the full extent of their lawful powers, and the citizens to put forth their best efforts with liberal contributions, to the end that the pestilence may be stamped out within the earliest possible time. As New Mexico is still a ward of the National Government, I am of the opinion that it owes a helping hand in the present emergency, and that the State of California has enough interest at stake as a neighbor to warrant its State Board of Health in calling the attention of the proper department to the subject.

While traveling along the Mexican border, I made repeated inquiries about yellow fever, and was glad to learn that there is no apparent danger this season. In the State of Sonora it has been entirely absent since 1885, and no danger was apprehended at El Paso of its introduction by the Mexican Central Railway.

Before returning on the inspection review, I had an opportunity, June tenth, to visit Cabazon and Whitewater Stations, with reference to the selection of a quarantine ground, in the event of danger from yellow fever or smallpox from Mexico. Cabazon is a telegraph station ninety-three miles east of Los Angeles, with an elevation of seventeen hundred and seventy-nine feet above the sea. Water is piped from a cañon on the north to the station, and brought in flumes to a ranch close by. There is only one dwelling house near, and no other buildings available for use; but tents would give adequate shelter in summer, and could be pitched at the flume east of the station, as the prevailing wind is from the west.

Whitewater is one hundred and one miles from Los Angeles, on the border of the desert, with an elevation of about eleven hundred feet. It is simply a section station, without telegraph or water supply, as the creek on the lower ground crosses the track one half a mile east of the station. In my judgment, Cabazon is sufficiently isolated, and in several important respects is preferable to Whitewater as a place of detention. On the whole, it is probably the most eligible point on this line.

Respectfully submitted.

S. S. HERRICK, M.D.,
Special Inspector.

From the foregoing report it is apparent that we will have to keep a continued and close watch upon our southern border during the whole season, which makes it absolutely necessary that our Legislature keep our contagious and infectious disease fund well replenished, as we do not know the day when we may have to institute an extensive quarantine station, with all the necessary paraphernalia which such a proceeding demands. The work of our Inspector was much favored by the courtesy of the Southern Pacific Railway Company, which extended every facility to him to make his inspection thorough and complete. This, however, has always been the policy of this company in its endeavor to protect its passengers from any preventable danger. Its coöperation with our Board has been all that we could desire, placing its trains and its officers at our disposal, whenever we sought its aid in discovering contagious disease, or preventing its entrance into California. This "entente cordiale" between the railway company and our Board enables us, with the least possible delay, to visit any point where danger threatens, and to find ready coöperation in any suggestions we may make looking to the safety of the traveling public and the sanitary welfare of the State.

In this connection, we desire to call the attention of the Board to the serious difficulty which sometimes attends the performance of a public duty by our Health Officers. During the epidemic of smallpox in Los Angeles in the year of 1887-88, when consternation prevailed among the citizens and the most rigid preventive measures were called for; Dr.

Hagan was Health Officer; upon him devolved the duty of isolating patients, establishing quarantine, and taking all measures possible to protect the public from contracting the disease. One of the patients died after removal from a tenement house, and the mother sued the doctor; a verdict was rendered against him for the extraordinary sum of \$7,000. Dr. Hagan, believing that he should not be made to bear this heavy burden, appealed to the Mayor and City Council to relieve him of it. As the whole matter is of great interest to sanitarians and officers of health, we have decided to print the appeal to the City Council, and also Dr. Hagan's petition and statement to the same body, giving the circumstances of the case and his expenses appended. The matter was referred to the City Attorney, who was of the opinion that the city funds could not be paid for this purpose, having been raised for other specific purposes; however, the majority of the Board were in favor of reimbursing Dr. Hagan, and by an unanimous vote agreed to pay the compromise note of \$2,750. This suit and verdict is likely to have a deterrent effect upon Health Officers if placed in a similar situation, owing to the uncertainty of what a jury will do. In this case the evidence did not justify the verdict, as neither negligence nor carelessness were shown, which the instructions of the Court required to be shown before a verdict could be found for the plaintiff. The following was part of the instruction given to the jury by the Court: "If you believe from the evidence that the defendant, whether acting officially or otherwise, acted carelessly or negligently in removing Ida Searles to the hospital, or negligently or carelessly placed her in an unfit or improper place; or, after placing her therein, treated her negligently or carelessly; or if you find, from any act of negligence of the defendant's, her death was caused, you must find a verdict for the plaintiff." The jury in this case was evidently moved more by sympathy than by either law or justice, and the innocent doctor had to suffer accordingly.

To the Mayor and Council of the City of Los Angeles:

GENTLEMEN: We, the undersigned Mayor and Council of said city during the years 1887 and 1888, respectfully represent, that during a portion of said years the city of Los Angeles was afflicted with smallpox. Dr. Hagan was Health Officer during a portion of that time. By his energetic and efficient action, we are satisfied that the city was saved from a terrible and widespread epidemic of that loathsome disease. The Doctor, during the time he was in office, successfully treated about one hundred and thirty cases of smallpox, which were cared for by the city at a heavy expense. We did everything we could, as representatives of the city, to stay the disease, and to make those that were sick as comfortable as possible.

The hospital that belongs to the city was not such an one as would best answer the purpose for which it was used; and we endeavored to remedy the defect, by having another and more suitable hospital built. Our efforts in that direction met with opposition and litigation.

During the epidemic, Dr. Hagan found it necessary, for the safety of the city and community, to remove a young girl, Ida Searles, to the hospital. She had been taken with a very malignant type of the disease; and though everything was done for her that could have been done, she died in about eight days after she was taken sick.

Her mother brought suit against ourselves and Dr. Hagan, and Dr. Cole and Mr. McEvoy, his assistants.

The Court granted a nonsuit as to the Mayor and Council, on the ground that no right of action existed against them—as all their connection with the matter was of a legislative character.

There were two trials in the case, and in both trials verdicts were rendered against Dr. Hagan and his assistants; the first, for \$5,000; the last verdict and judgment being for \$7,000.

As before stated, we had endeavored to have a more suitable hospital erected, but we were enjoined by the Court from doing so; and, it so happened, that in one department of the Court we were under injunction, restraining us from building a better hospital; and about the same time, a jury in another department of the Court rendered a verdict against Dr. Hagan and assistants, for removing Ida Searles to the only one we had.

In cases of this kind, it has always been the custom of cities to save their officers from liabilities incurred in an honest effort to discharge their duty to the city and community, and we respectfully ask that the city now pay the note that Dr. Hagan has been compelled to give, in settling this heavy judgment (amounting to \$2,750) by way of compromise. The doctor has already been put to about \$1,500 in expenses, and has been terribly harassed and worried by the suit.

(Signed:)

W. H. WORKMAN,

Mayor City of Los Angeles, in 1887 and 1888.

And all members of Council of 1887-88.

JUNE 9, 1890.

To the Mayor and City Council, Los Angeles City:

Dr. M. Hagan, formerly Health Officer of the city of Los Angeles, respectfully begs leave to submit:

That during the early part of the year 1888, and while he was acting as such Health Officer, one Ida Searles, aged sixteen years, daughter of Mattie McLaud (formerly Mattie Searles), the wife of J. F. McLaud, was taken down with the smallpox at a tenement house on San Pedro Street, in said city; that he visited the said Ida, and found her suffering with a peculiarly malignant form of the disease in question; and, conceiving such to be his duty, that he removed her to the smallpox hospital in said city, having first obtained the mother's consent to do so. After being so removed, and while still in said hospital, Ida, as from the nature of her attack was inevitable, died.

That thereafter suit was brought in the Superior Court of the county of Los Angeles, State of California, by Mattie McLaud and J. F. McLaud (her said husband) against several of the city officials and Doctors Hagan, Cole, and Mr. McEvoy, the two latter being Dr. Hagan's assistants. The plaintiffs were nonsuited as to the city officials, on the ground that they merely acted in a legislative capacity, thus leaving Doctors Hagan, Cole, and Mr. McEvoy to defend the action.

That a verdict was returned against the said three defendants, and in favor of the plaintiffs, and judgment was awarded thereon for \$5,000, from which an appeal was taken.

That recently the plaintiffs approached Dr. Hagan, with a view to compromising the matter, and a compromise was effected on a basis of \$2,750.

And Dr. Hagan further says:

That he was appointed Health Officer for 1887, and his time expired the last day of December, of that year; but that he was kept by the Board of Health, against his will and protest, to manage smallpox that threatened to break out in the city at the beginning of the year, and was not relieved by his successor until the fifteenth of February, 1888; and that during this interval the said Ida Searles was taken sick and died.

That on the tenth of February, 1887, smallpox broke out in the city of Los Angeles, and rapidly spread in lodging, boarding, and tenement houses.

That on the third of March, 1887, the Board of Health of the city of Los Angeles, advised by the State Board of Health, and in the presence of the Health Officer, Hagan, passed a resolution instructing the Health Officer to carry all persons attacked with smallpox in hotels, boarding, lodging, and tenement houses, to the smallpox hospital; so in moving Ida Searles from a *tenement house*—where the disease would positively have spread, owing to the close proximity of unprotected persons—he was acting under the positive orders of the city.

The evidence of Mrs. McLaud shows that she went at the request of the Health Officer, without any severe measures being used; and that Dr. Hagan was present, treated them kindly, and after the mother had wrapped Ida up to her own satisfaction, he took another blanket and folded it about the patient, remarking that every care *must* be taken for the comfort of the girl.

An unusual thing, Dr. Hagan put his deputy, Dr. Cole, on the ambulance to see that the driver was careful, and to avoid any accidents.

Dr. Cole, who was employed by the city to treat smallpox cases, visited Ida twice a day, whereas it was his custom to give a smallpox patient but one daily visit.

Dr. Hagan insists that out of one hundred patients he ordered to the smallpox hospital, Ida Searles received more care and special attention than any other one, and yet her friends are the only ones that ever complained.

The Health Officer succeeding Dr. Hagan had smallpox to contend with for six months, and carried every case, numbering one hundred and thirty, to the same smallpox hospital without any repairs, including some of the wealthiest people of the city. Ex-Mayor Bryson's son was taken to the identical room in which Ida Searles died.

The second verdict brought in for the prosecution was \$7,000. The defense appealed to the Supreme Court; and now, almost a year since the compromise of \$2,750, hereinbefore mentioned, has been proposed and accepted, the defendants believing that it would cost that much to follow up the case through the Courts. Dr. Hagan has given his note, at thirty days, to secure the said sum of \$2,750, which note falls due on the day and date above mentioned.

Now, therefore, Dr. Hagan respectfully asks the city of Los Angeles, inasmuch as he was acting for and under the direction of the city authorities, to pay the above note, and relieve him of an unjust burden.

In defending the case Dr. Hagan has already paid out as follows:

Attorney's fees	\$500 00
Stenographer and type-writer's fees	500 00
Printing for Supreme Court	100 00
Witness from Portland, Or., and elsewhere	300 00
Total	\$1,400 00

Respectfully,

M. HAGAN,
Late Health Officer.

DIPHTHERIA.

Since our last Biennial Report, when diphtheria was declared a permanent resident in California, we have had no reason to change our opinion as to the permanency of its habitation. We find at all seasons of the year, and in all parts of the State, reports of its presence here and there; without any startling epidemicity it carries off its victims steadily and unceasingly. To account for this local pertinacity in the disease, we must admit our ignorance of its primary cause. It has been ascribed to a germ which has been demonstrated by Loeffler and others. Prudden, however, in twenty-four cases, in nearly all of which autopsies were obtained, did not find this bacillus of Loeffler in any one of them. On the other hand Roux and Yersin, in a series of experiments, confirm Loeffler's results. They found the bacillus in fifteen cases of diphtheria, and with pure culture were able to reproduce the disease in animals.

However, the consensus of opinion is that the disease is owing to a living germ; that it is an external and not an internal parasite, and that it is a filth disease, inasmuch as the germ can be cultivated in soil contaminated by filth, and in air saturated with emanations from drains and sewers. Its presence in the homes of the rich and prosperous as well as in the cabin of the poor, in the isolated farm house as well as in the crowded city, may be ascribed to the virulence and vitality of the poisonous germ. It is as virulent when dried as when moist, and has been found in a living condition after being frozen for several hours. Unfortunately its presence is not always made known by its virulence.

In July, 1888, diphtheria broke out in the State Insane Asylum in Maine, and in spite of isolation, cleaning, and disinfection, persisted for months, the last case occurring in May, 1889. The disease was introduced into the institution by an attendant just recovering from "simple sore throat," as it was diagnosticated in the absence of medical attendance. This history exemplifies how difficult it is to stamp out the infection of diphtheria under certain circumstances. We would entertain more hope of its banishment from California if we could insure perfect isolation of the patients and their attendants, their immediate disinfection, together with their clothing, the perfect cleansing of all the utensils used by the patient, the thorough cleaning and disinfection of the rooms occupied by those infected, the systematic inspection of the schools, that no children with any kind of sore throat be permitted to associate with their fellow pupils, the positive prohibition of public funerals of those dead of the disease, and the official disinfection of the house from which the corpse was borne. With these precautions we certainly would see the disease very much lessened in frequency, and by the continued exercise of sanitary vigilance, we might hope to banish it altogether in a few years. The reports of the past two years give us five hundred and sixty-eight deaths from diphtheria, and two hundred and sixty-five from croup. Taking both together we have eight

hundred and thirty-three deaths from a wholly preventable disease, if we had only the requisite skill, patience, and perseverance to apply thoroughly the proper remedial measures to arrest it.

Although Prudden believes in the insusceptibility of animals to diphtheria as we know it in man, nevertheless the cases are numerous where animals have contracted a disease not to be distinguished from diphtheria, and likewise children have contracted a similar disease from animals. Dr. Augustus Schefer, writing from Tehachapi, Kern County, last September, reports four cases of diphtheria, the first of which was supposed to have been contracted from a pet cat. Several cats had died on the premises with obstructed respiration; some turkeys became similarly affected. The doctor had one of the chickens which was affected killed, and he found the throat covered with a white membrane, which was readily detached. Subsequently some other children became affected in this neighborhood, and some died. In Sacramento, while in attendance upon a case of diphtheria, we noticed a large pet cat in bed with the sick girl, who was very fond of it. As the child convalesced the cat sickened, and in a few days had such an offensive discharge from its nostrils and mouth that it had to be killed. Upon examination of its throat it was seen to be covered with a thick membranous exudation, which extended into the nose.

In June, 1889, a communication was received from Dr. H. N. Miner, of Colfax, in which he stated that diphtheria had been epidemic in Gold Run, a mining town not very far from Colfax. Since December, 1888, up to the time of writing, there had been twenty-one cases and three deaths. He ascribes the disease to the unsanitary condition of the town. He says: "There are in the town two old reservoirs, and leading from them and passing through the residence portion of the town are several ditches. In the reservoirs and ditches all kinds of organic matter, together with drift and waste wood, has accumulated. Not enough water flows through the reservoirs and ditches at any time to flush them, but sufficient to keep moist the organic matter, which is almost constantly in a decomposing state. People residing in the immediate vicinity of these ditches have been the worst sufferers. Wells are also located near, and in many cases just below the ditches. Owing to the unwillingness of the people to believe in the contagiousness of the disease when it first appeared, fumigation was not practiced, neither have the cases been isolated."

As a result of this folly, we find Dr. Miner again writing, November, 1889: "Diphtheria is again epidemic in Gold Run. There has been twelve cases, several of a malignant type. No united effort have been made to improve the sanitary condition of the town since the disease prevailed in the place nearly a year ago."

As this narrative illustrates most fully the difficulty of stamping out the disease in even small villages, the almost utter impossibility of removing it from larger cities is apparent. In San Francisco, during the latter part of the year 1888 and the earlier months of 1889, diphtheria was quite prevalent. In November, 1888, sixty-two cases were reported, with twenty-two deaths. In February thirty-four cases were reported, with ten deaths. In March only twenty-two cases were reported. April and May showed a further decrease. The disease, however, is endemic; it shows its presence in greater or less numbers

every month, and although all possible precautions are taken to prevent its spread, the germs will be disseminated in some way or other.

SCARLET FEVER.

During the past two years the cases occurring of this disease have been comparatively few in number and mild in character. There has been nothing approaching an epidemic of scarlet fever in any locality. In San Francisco, in the fall of 1888 and the beginning of 1889, up to the present time, there have been sporadic cases of the disease reported, with very limited mortality. Dr. Rattan, Health Officer at Antioch, reported a few cases there in June, 1889. The infection was supposed to have been conveyed from Oakland by a family who was visiting there. From the first case ten subsequent ones developed.

Dr. J. H. McKee had several cases of scarlet fever in Elk Grove, and traced its advent to the following circumstances: It seems that the hired girl's brother had scarlet fever in Sacramento some ten months before she was employed in Elk Grove. Some time after her arrival, four of the children of the house went with this girl to her room to help her unpack her trunk, which they did, and handled, no doubt, the clothes the girl wore when waiting on her brother ten months previous. In a week or ten days after this episode the four children sickened simultaneously with scarlet fever. The baby was not present at the opening of the trunk, and escaped the disease until the other children were convalescent, and then she came down with it. These cases show the necessity of thorough disinfection of all clothing in contact with scarlet fever, as well as the persistence of the infectious principle, months after it is acquired. As this family lived on a ranch several miles from town, and had it not fortunately been traced to its origin by Dr. McKee, it might have been supposed to have arisen *de novo*. We believe that all cases of scarlet fever have their origin from a previous case, and until the avenues of infection are better guarded than at present we must not be at all surprised at the appearance of sporadic cases of scarlet fever that are apparently unaccountable as to their source.

From the very infectious nature of this disease, it should be the rule for every Board of Trustees, Council, or County Supervisors to pass an ordinance compelling the designation of every house having scarlet fever within it by a distinctive flag, so that the public might be warned in time of the danger they were encountering in visiting such a house. It has come to the writer's knowledge of several cases of scarlet fever contracted in visiting houses where the disease was, not knowing the character of the complaint until too late to avoid taking the infection, or carrying it away on their garments to other parties.

MEASLES

Was noticed as present in some parts of California during the past two years. In 1886 the disease was entirely absent from the State for several months, but since that time it has been reported from one place or another every month. The disease has been very mild, and but very few cases of the malignant form, or "black measles," as it is called, have been reported.

Sevestre, at a meeting of the Société des Hôpitaux, says that in order

to prevent the spread of measles its mode of propagation should be understood. Rubeola is very contagious during the period of invasion, continues to be so, but at a less degree during the eruptive period, and ceases at its termination. Transmission is usually effected by the circumambient air. Contagion by a visitor, or by objects which the patient touches, is rare. The contrary takes place in diphtheria, for contaminated objects conserve their contagious powers for years, consequently the prophylaxis of the two affections differ. In the case of measles, the patient should be isolated without delay; but in diphtheria, besides isolation, every object in contact with the patient should be thoroughly disinfected. The great difficulty the sanitarian has to deal with in the prophylaxis of measles is the fact that the disease is communicable many days before the eruption appears, consequently isolation cannot be practically accomplished until the disease has already infected those susceptible to its influence. This peculiarity of the disease has given rise to the question whether the sanitarian is not justified in confining his exertions to the preparation of the environments of the patients, seeing that all insanitary influences are removed from the vicinity of the disease, rather than make fruitless endeavors to isolate an affection that is purely ærobie in its conveyance, and, consequently, impossible to restrict to the person attacked. It has also been argued that measles, being a much milder disease, as a rule, in children than in adults, it is less hazardous to them to permit them to have it when young than to allow them to be exposed to the risks of a more formidable attack when of mature age. This theory has so many advocates that the sanitarian will find it difficult to obtain consent to the isolation of measles. We believe, therefore, that he will be doing his duty if he attends fully to conditions surrounding the patient—to have all sources of filth removed, to see that the air surrounding the patient is pure and abundant, the water used is free from contamination, and the clothing and dwellings of the afflicted are cleaned and disinfected. We believe that the so called "black measles" is the result of constitutional depravity, rather than any peculiarity in type of the disease, as when it is present it seems to confine itself to personality rather than to community, and only attacks those whose system has been enervated by some previous ailment or depressing influences of some kind.

TYPHOID FEVER.

During the past two years, as in the previous two years, this indigenous disease was remarkable for the sporadicity of its character, and the mildness of its type. There seemed to be no tendency to epidemicity in any of the instances where the disease was reported, and most of them could be traced to local causes. The opinion is gradually gaining ground that where typhoid fever exists, the sanitary conditions are bad, and that with proper care of the soil, water, and food, the banishment of typhoid fever from our list of communicable diseases would be an assured fact.

One other point has now been definitely settled, and that is, that the poison of typhoid never generates itself; it always is derived from a previous case. There are very few medical men of any eminence who accept the *de novo* theory, or believe in the spontaneous origin of the disease. We, however, hear and read of these cases every day, because,

in so many instances we cannot trace the effect to its cause. In vain we examine the cellar, and the privy, and the well, hear that the patient has not been exposed, and in no possible way could he catch the disease, therefore it came of itself.

In histories of this kind we cannot exclude the possibilities of infection from some unsuspected source. To do this, we should have the history of those who come and go about the place; the history of the food and water the patient consumed when temporarily away from home, with dozens of other means that possibly might convey the disease germ to his system. In the seemingly difficult task of believing that infection could be conveyed in the absence of any apparent cause, we must not forget the vitality inherent in the disease germ. It has been proven that the bacillus of typhoid can lie dormant for years in a suitable medium, as in a blocked up drain, for instance. It resists cold, as was shown in the epidemic at Wilkesbarre, where the germ lay buried in snow for months. It resists heat up to a certain point; can be carried in the air with the dust of dried excrement, and thus inhaled, so that really the fact of our not finding any obvious cause for the presence of typhoid will not warrant our coming to the conclusion that it can have spontaneous generation; we can, however, be assured that by perfect cleanliness of person and surroundings, with a purified earth, air, and water, we will not be troubled with typhoid fever; it is a fever essentially propagated by filth, and nourished by retention among the living of what experience and common sense teaches us should be removed. It is our mission to inculcate this fact not only among individuals, but endeavor to educate our law makers upon this point, that they may provide the necessary sanitary officers to instruct their constituents in the truths of science.

As Dr. Hill, in his address before the British Medical Association, says:

The sanitarian has still to go forth and try to teach that, without cleanliness, health is impossible, and that though much has been done in this direction, very much indeed still remains to be done. In order to effect the required amelioration, we must in the first place secure, as far as possible, cleanliness and purity of air, water, soil, and food. This is the object to which human effort has been directed more or less from the earliest historic times. The Jewish code of laws clearly provides for such conditions with a precision and detail which strike the modern mind as over-elaborate, while the Romans had a system of sanitation which, as regards its baths, its aqueducts, and its gymnasia, magnificent evidences of which, after more than two thousand years, remain to bear witness of it, excites wonder and admiration. The fact that cleanliness and purity, so much inculcated and practiced thousands of years ago, should have been almost entirely neglected in modern times, is not only incredible but for the indisputable proof of it, but is absolutely humiliating. After the fall of the Roman Empire, Europe lapsed into social conditions of filth which became habitual, and some religious orders actually inculcated it as a virtue. Not only have individuals to be taught, but sanitary authorities also require educating on this point. Much remains to be done in the direction of pure water supplies and the preservation of rivers from pollution; the air is still rendered filthy and injurious by overcrowding, want of ventilation, intra or juxta-mural burial grounds, offensive trades, badly constructed or improperly managed sewers and drains, the keeping of animals near to dwellings, and conservancy systems of refuse disposal, which, by retaining in the midst of the living what Nature distinctly tells us should be instantly removed, violate in the most direct and in the most offensive manner one of her greatest and most legible laws, with the inevitable result of exacting the payment of a frightful penalty for the infraction. The surface of the earth has to be rid of cesspools and surface filth of every kind, whether specific or non-specific, and the highest standard of purity aimed at with never-failing persistency. It is difficult to over-estimate the ultimate advantages of such a policy, but we are assured already by past experience that they must be very great to humanity, and will prove the truth of the old dictum that "cleanliness is next to godliness."

The truth of these words is apparent to every one engaged in the conservation of health and the prevention of disease; and when we contemplate the lame excuses and miserable subterfuges resorted to by Boards of Supervisors to avoid the organization of Health Boards or the appointment of Health Officers, it is, as Dr. Hill says, "Not only incredible, but absolutely humiliating."

MORTUARY STATISTICS.

For the fiscal year from June 30, 1888, to June 30, 1889, the number of deaths reported to this Board was eleven thousand two hundred and four, inclusive of four hundred and forty-seven stillbirths. The average population heard from monthly being estimated at seven hundred and four thousand two hundred and sixty-two, would give us an annual death rate of 15.91 per thousand. Owing to our present inability to collect all the deaths in the State, this percentage may be taken as the average yearly mortality.

California, according to the last census, contained a population of one million and a quarter. We therefore may calculate on having received the mortality of nearly two thirds of the State, as the balance of the population is scattered in small towns, villages, mines, and farms. The deaths in them would naturally be somewhat less than in the larger towns and cities; probably two thousand eight hundred, or a fourth more, would exceed the mortality of the unascertained places. The statistics being unreliable, owing to the imperfect working of our registration law, we cannot give an exact percentage of deaths, but are certainly within the mark in putting it at fifteen per thousand for the year 1888-89. We are in hopes that by the time the next biennial report is written our registration laws will be so amended and improved that we will have less difficulty in presenting to your Board the actual death rate of the State, and likewise the number of children born therein. Of the causes of death for that fiscal year we find—

Consumption

To be credited with one thousand seven hundred and twenty-seven deaths, a percentage of fifteen and a half to the total number, which is about the same ratio as in the year 1886-87. Among the one thousand seven hundred and twenty-seven decedents registered, we find seven hundred and forty-four foreigners, four hundred and fifty-one natives of the Atlantic States, three hundred and thirty-four natives of the Pacific States, and one hundred and ninety-eight whose nativity was unknown. It will thus be seen that the very large majority of those dying of consumption came into the State with the disease already in their systems. The deaths of those born in the Pacific States exceeded by a small number those in 1886-87, but not in sufficient number to draw any conclusion as to whether an increase of the complaint among the native born was a fact or a fiction.

Pneumonia.

During the fiscal year 1888-89, the deaths from acute pneumonia numbered seven hundred and ninety, a trifle over 7 per cent of the total mortality. The largest number of deaths occurred in children under one year of age, and in elderly persons over sixty, and nearly double

the number of males to females. The highest mortality was in November, and the lowest in September, and greater in the coast counties than in the interior.

Bronchitis

Caused during the same year three hundred and thirty-seven deaths, eighty-nine being children under five years of age. The highest death rate from this disease occurred in November, December, January, and February, and the largest mortality among those over sixty years of age.

Whooping-Cough.

Among the zymotic diseases of the lungs, we find whooping-cough was fatal in fifty-nine instances during the year. This is a very small mortality, considering that the disease was quite prevalent during the year, and epidemic in many localities.

Diphtheria

Being endemic in the State, caused three hundred and forty-three deaths, two hundred and eighty-three being under twenty years of age. The largest number of deaths occurred in the most densely populated cities, San Francisco having one hundred and fifty deaths, Oakland fifty-two, Los Angeles fifty-nine, and Sacramento only six deaths, although its population is nearly thirty thousand. The valley of the Sacramento being very dry, diphtheria does not seem to flourish as well as in those places where the humidity of the atmosphere is greater. In the interior towns of the State the disease was in sporadic form. The highest mortality of any one month was in November, and the lowest in April.

The public is generally better educated in the contagiousness of this disease than formerly, and now seem to take better precautions to prevent the spread of the disease. Occurring, as it frequently does, in the crowded tenement houses of the city, it is almost a matter of impossibility to effect a perfect isolation of the patients, and consequently we find it propagated among that class of persons to the imminent danger of their wealthier neighbors. It would be a sanitary measure of great importance if a general law was passed making it compulsory to notify the public, by a distinctive sign of warning, placed upon every house containing disease of an infectious or contagious character. I am not aware whether such a law could be made general, but trusting to a municipality to frame such an ordinance, is leaning upon "a broken reed," as you can scarcely find a Board that can unanimously agree upon the necessity of such a course, the majority believing that it would be infringing upon the liberty of the subject; another set thinking that they have no right to make the affliction that has thus visited a family a matter of public declaration; while a still smaller number think the public can take its chances, as it heretofore has done. Sanitary measures are matters of slow growth, and must continue to be until sanitary education can be as generally diffused among the masses as reading, writing, and arithmetic.

Croup

Caused the death of one hundred and thirty-five children, the majority being under ten years of age. As a rule, whenever a case of croup was reported, diphtheria was found in its immediate neighborhood. This fact has been so often remarked that the State Boards of Health of Michigan, Iowa, and some others, have adopted resolutions to the effect that for sanitary purposes, membranous croup shall be considered identical with diphtheria, and that it be included in the list of contagious diseases. Nearly all German authorities take the view of the unity of croup and diphtheria. We think it unquestionable, however, that there are cases of membranous croup which have no etiological relationship to diphtheria, but as we have no trustworthy means of diagnosing these cases from those of diphtheria, the safer course for us to pursue is to consider them diphtheritic, and surround them with all the precautions we would use if we knew them to be of diphtheritic origin.

Scarlet Fever.

The deaths from scarlet fever were, during the year, reported as thirty-eight, which indicates how mild the disease was and how little fatality it produced. Nearly all these deaths occurred in children under ten years of age.

Measles,

During the year 1889, caused but eleven deaths among those reported to this Board, all but one in children under five years of age. The disease was reported in many places throughout the State during the year, but in such a mild form that death was rarely reported, except from some secondary cause, as bronchitis or pneumonia.

Cholera Infantum

Caused two hundred and thirty-three deaths. Heat being the most potent factor in the production of this disease, we find it commencing its ravages in April, with fifteen deaths; May and June they had increased to twenty-one; July, to forty-nine; August, to thirty; September, to thirty-three; October, to thirty-two, and then dropped to fifteen in November, and three in December. It will be observed that the highest mortality was in July, August, September, and October, at which time the earth had attained its maximum heat, which, perhaps, may tend to confirm the conclusion of Ballard, that the temperature of the soil is the key to its etiology; and that summer diarrhœa does not begin until the temperature of the soil, at the depth of four feet, has risen to 56 degrees Fahrenheit (13.36 degrees Centigrade). He considers a porous soil as a better medium for bacterial growth, as retaining more moisture. Hence, towns so situated are more likely to have diarrhœal diseases prevalent. Other authorities have found no constant relation between a high average temperature and the number of fatal cases. In this State we do find the temperature an important element in the production and the fatality of the disease, and we further find that when moisture is added to the heat the disease is increased in frequency and fatality.

Diarrhœa and Dysentery

Caused, including *Cholera Morbus*, one hundred and seventy-one deaths. It prevailed, to a greater or less extent, in every part of the State, but not in an epidemic form. The greatest mortality occurred in May, June, September, and October. In July and August the death rate was very small, although these months are usually most prolific of these diseases. We also find that the majority of the deaths were confined to children under five years of age, over one hundred deaths being recorded as occurring thus early in life. From five to ten years, there were only two deaths reported; from ten to twenty years, no death was recorded from these diseases. As we approach the decline of life the mortality increases, thirteen being recorded as over sixty years of age.

Typhoid Fever

Caused three hundred and fifty-two deaths, which were so reported. This would not comprise the total mortality of this disease throughout the State, as the returns are so incomplete. It may, however, be taken as a fair basis of nearly two thirds of the State, and must indicate that for the year the prevalence of the disease was under the average.

There were seventeen deaths from *Typho-malarial Fever*, which may be added to those from typhoid fever, as the distinctive difference between the two is yet a matter which has not been satisfactorily demonstrated. We believe that the drift of opinion among the most observant physicians on this coast is in favor of the unity of the diseases, the differentiation being more in the objective symptoms than difference in type. The largest number of deaths were in the months of September, October, November, and December, when they averaged thirty-eight each. For the year the average was twenty-eight and a half per month. This would seem to indicate a local cause for this effect, rather than any general condition dependent upon seasonal or meteorological changes.

Cerebro-Spinal Fever.

We find that in the fiscal year 1888-9 there were only eighty-nine deaths recorded from this disease, and about equally divided between the sexes; fifty-one of these decedents were reported as under five years of age, which casts a doubt upon the correctness of the diagnoses of these cases. Twenty-five deaths were recorded as under thirty years of age, and six from thirty to fifty years old. Some of these cases were reported as presenting all the characteristics of cerebro-spinal meningitis, but in no instance was there any tendency to the spread of the disease.

Meningitis.

Under this heading we find recorded two hundred and fifty-three deaths. Of these, one hundred and sixty-five were under five years of age, fifty-one were under thirty years, and twenty-three over that age. This classification includes those with tubercular diseases, as well as the purely inflammatory class. No deduction can be drawn of their relative frequency, except by consideration of the age of those reported.

It will be thus seen by your Board that this imperfect resumé of the deaths during the fiscal year indicate a very favorable condition of the public health. The zymotic diseases were mild in character, were

nowhere extensively epidemic, and there were only eleven deaths from smallpox within the State.

REVIEW OF THE FISCAL YEAR 1889-90.

We find the number of deaths for the fiscal year recorded as thirteen thousand and thirty-four, which is an apparently large increase over the deaths reported the previous year. This can be accounted for by bearing in mind that the law forbidding the burial of any body without permission was being brought into practical observance, consequently more deaths were reported than ever before. We are still very deficient in our mortality returns, as the difficulty of getting persons to obey the law where no health organization exists is very great. We believe, however, that we have succeeded in getting three fourths of the total mortality, which would leave us about thirty-two hundred and fifty odd deaths to hear of, so that we may fairly estimate the total mortality of the State, in round numbers, to be sixteen thousand three hundred. Our population being one million two hundred and fifty thousand, the percentage of deaths for the year would be 13.3+ per thousand, which would be quite a decrease from the estimation of the preceding year, and shows a remarkably healthy condition of the public health throughout the State, which we believe to be true, as all our correspondents are agreed that the past year has exhibited greater freedom from disease than ever before known.

The average amount of sickness has also been less than usual, and no epidemic, except influenza, has been noted in any locality. Influenza made its appearance in the latter part of November, and became quite prevalent in December, 1889. In January, 1890, it was epidemic throughout the State, but while so extensively disseminated, nevertheless it was mild and without fatality, except when it was the precursor of acute pneumonia or acute bronchitis; in these cases a fatal termination was often had. In February the disease began to abate, and by March was only mentioned here and there by our correspondents. The marked feature of the epidemic was, as usual, the great debility which accompanied the disease. Its power of producing prostration was very great, and many persons were months in recovering from its debilitating effects.

Of the diseases producing the maximum of deaths, we class

CONSUMPTION,

Which caused twenty-one hundred and forty-two deaths. Of these eight hundred and seventy occurred between June 30, 1889, and December 31, 1889, while between the latter date and June 30, 1890, twelve hundred and seventy-two deaths are recorded. This would seem to indicate that late winter and early spring months were the most fatal to consumptives. The average monthly death rate from June to December averaged one hundred and forty-five, while from December to June the monthly average was two hundred and twelve, being a difference of four hundred and two in favor of the fall and early winter months. The deaths reported for the fiscal year 1889-90 exceed in number any yet recorded by this Board. Whether this is owing to the increased number of precincts heard from, or increased immigration to the State of those

suffering from the disease, or the spread of the disease within the State from contagion, we have as yet no means of ascertaining.

The larger number of deaths occurred in San Francisco, it being the center of the great hospital system of the State, towards which all the poor, needy, and afflicted make their way in hope of relief, or in expectation of death if no relief can be afforded them.

Only five hundred and twenty-one died that were natives of the Pacific Slope, one thousand four hundred and ninety-one being immigrants from the Atlantic States and foreigners; forty died whose birth-place was unknown.

From the number of decedents registered from the Atlantic States and foreigners, we infer that our increased mortality from consumption was among those who sought our shores in hope of regaining their health.

PNEUMONIA

Shows also a large increase in the death rate for the past year, the number being one thousand one hundred and twenty-four, against seven hundred and ninety the preceding year. This, no doubt, was owing to the prevalence of influenza, as we found that during its absence the first half of the year the deaths were only three hundred and fifteen, and this included November and December, when influenza was beginning in the State; whereas, from December to June, which is inclusive of the worst part of the epidemic, the deaths from pneumonia rose to eight hundred and nine. We may, therefore, fairly charge the epidemic influence of *la grippe* with predisposing to pneumonia in a very well marked degree. Pneumonia was, however, not epidemic in any part of the State, but prevailed extensively along the coast counties and in the higher altitudes.

BRONCHITIS

Also showed the presence of influenza by an increased mortality, three hundred and eighty-seven deaths being ascribed to it. Of these, as in pneumonia, the greater number occurred between December and June. We find that the deaths among infants under five years of age numbered one hundred and seventy-four, while between forty and sixty years and over the deaths were one hundred and seventy-five, showing how prevalent and fatal the disease was among those that had turned the meridian of life.

DIPHTHERIA AND CROUP.

During the fiscal year 1889-90, the deaths from diphtheria numbered two hundred and twenty-five, which, added to one hundred and thirty from membranous croup, makes the sum total from these twin diseases three hundred and fifty-five, which is about one hundred and twenty-three less than the preceding year. These diseases were not very prevalent, no epidemic of them being reported. There is no doubt the mortality from diphtheria could be very much lessened if the public appreciated the importance of isolation, disinfection, and fumigation wherever these diseases exist. Dr. J. Renon, in a recent publication on diphtheria, regards it as being at first a local disease, afterwards becoming general; although Bretonneau and Trousseau inclined to the same opinion, it has not been generally accepted by the profession. However,

it is a point of wisdom to accept the theory so advanced by so recent a writer, as it can do no harm, and by prompt local treatment of the diphtheritic patch we may prevent the disease from becoming general.

Although the discovery of the contagion of diphtheria is not as yet satisfactorily demonstrated, there can be no question but that such a contagion exists; that it is propagated from the sick to the sound, not only by direct contact, but through a space which, according to Dr. Lancry, is very limited. Dr. Renon considers that the diphtheria microbe is developed in the soil, and is carried therefrom into the atmosphere, from which it is deposited on the surface of things—clothes, furniture, the human body, etc. It is thus seen how much the spread of diphtheria depends upon the care taken of those affected. Prompt measures taken with the first case may save a community from a severe epidemic of the disease; and proper sanitary care of the soil and surroundings of the dwellings may prevent the development of the microbe.

WHOOPIING-COUGH,

Although extensively prevalent in many parts of the State, caused but fifty deaths, which is a decrease from the previous year. The disease reported was of a mild character, and spread very slowly.

SCARLET FEVER

Was noticed in sporadic form throughout the State. It was of a mild type, without tendency to become epidemic. It caused only thirty-five deaths, which is convincing evidence of the mildness of the disease. The largest number of deaths was in October, November, January, and May, twenty of the decedents being under five years of age.

MEASLES

Was almost entirely absent from the State until the fall of 1889, when one death occurred in San Francisco in August. No other death was reported until January, 1890, when the disease became prevalent in San Francisco; from that time until June 30, 1890, thirty-nine deaths were reported from it, thirty-two of them being children under five years of age. The prevalence of the disease since January has been observed in many parts of the State, but the type has been very mild, and the number of adults attacked was limited. The most fatal complication observed was capillary bronchitis in children of tender years, which will account for the mortality being chiefly confined to this class of patients.

SMALLPOX,

We are happy to say, was entirely absent from the State during the fiscal year, and we hope, by the operation of the law making vaccination compulsory upon all children entering the public schools, to throw such a safeguard over the entire State that such a disgraceful thing as an epidemic of smallpox will never again be experienced in California. Of course, this will depend upon the completeness with which the law is carried out. If School Trustees, through indolence or ignorance, neglect their duty and permit the law to be evaded, then can we look to

no such immunity from disease; but if the guardians of our public school system do their duty honestly and completely, we need not fear an invasion of smallpox extending much beyond its seat of commencement.

CHOLERA INFANTUM

Caused one hundred and eighty-three deaths, all but one being under five years of age. The greatest mortality was from June to November, and the largest mortality of any one month was June, 1890, when fifty-one deaths were reported. There were several very warm days in June, and it was noticed that whenever a warm wave came down the valleys, the summer diarrhœa of children immediately increased in frequency in those places.

DIARRHŒA AND DYSENTERY,

Although quite prevalent during the summer months, caused but one hundred and fifty-one deaths. The greatest mortality occurred in September and October. These diseases were of a mild character without any epidemic tendency, and, as a rule, easily controlled by suitable remedies.

TYPHOID FEVER.

The mortality from this disease was almost the same as for the previous year, three hundred and fifty being the number. In 1888-89 it was three hundred and fifty-two. This is quite a small mortality when we consider the number of precincts heard from. If to these deaths we add twenty deaths attributed to *typho-malarial fever*, we have an aggregate of three hundred and seventy deaths from these diseases. The largest number of deaths occurred during the winter months, from October to January.

REMITTENT AND INTERMITTENT FEVERS

Were reported to have caused forty-three deaths, which is a very limited mortality for paludal fever, and indicates that our types of malarial disease are, as a rule, mild, and without that perniciousness that is so often observed in the fevers of the Southern States.

CEREBRO-SPINAL FEVER

Is credited with one hundred and three deaths. All were sporadic cases, and occurred in different parts of the State. One half of these deaths being in children under five years of age, the correctness of the diagnosis of cerebro-spinal fever is open to some doubt.

MENINGITIS.

Two hundred and sixty-one deaths were reported under the head of meningitis, inclusive of the tubercular variety. One hundred and sixty-five were under five years of age. The probabilities are, therefore, in favor of the presumption that the majority of these were of the tubercular form of disease, although the purely inflammatory form is more frequently found in young children than is generally supposed.

In this partial review of the principal causes of death during the fiscal

year 1889-90, it will be observed that the purely zymotic diseases, so called, were fatal in less than 10 per cent of the total mortality. This indicates that these diseases were of a mild character generally, and much limited in extent.

LEPROSY.

Although no fatal case of leprosy was reported to this Board, your Secretary has been made aware of many cases being recognized in the State from the frequent inquiries made to him as to what disposition the counties harboring them could make for their care or disposal. Of course the only reply possible was to isolate them, and that each county must take care of its own lepers. As a rule these people were surreptitiously shipped to San Francisco, under the belief that that city had a leper hospital, and that it was supported by the State.

In the valuable paper on leprosy contributed to this report by the President, Dr. Orme, it will be seen how leprosy is gradually diffusing itself, and how necessary it is that some means be adopted to arrest its spread. We believe it is the duty of the State to do this, by providing a State institution for the care and treatment of these people, and most respectfully submit to your Board the suggestion of having a bill introduced at the coming session of the Legislature providing for the erection and maintenance of an hospital for lepers, where all those now scattered throughout the different counties could be gathered together and isolated from their fellow men. This would meet with the approval of every citizen who gave the matter a moment's thought, as the amount of tax levied to provide for this institution would not cost each county one tenth of what the provision for the case of a single leper would if he had to be isolated and provided for by the county. There is a case now in one of the southern counties, where the Supervisors had to erect and furnish a small house for his accommodation, provide a man to watch it, lest the inmate might escape quarantine, and feed and take care of both at the county's expense. There is only the one leper, so far as discovered, in the county. It cannot get rid of him, as he is a white man of some standing in the county, and yet he must not be allowed to attend his business or mingle with the public, lest he infect others. This county will send a strenuous advocate of a State Leper Hospital to the next Legislature, and if other parts of the State who have lepers to support will give their earnest aid, this humane and needful object can be obtained.

OUR CORRESPONDENTS.

Our last report showed an increased number of the correspondents to this Board. I am now happy to state that these have still further been augmented by the establishment of so many local Health Officers, whose reports enable us to present to the Legislature this record of what your Board is doing to augment the public health. The information afforded by our correspondents regarding the prevailing diseases in different parts of the State is very valuable. Through them we are enabled to watch the course of disease and ascertain at once any threatened danger by epidemics; they also enable us to determine the probable condition of the public health. From the reports received during the past two years we are confidently enabled to say that two more disastrous years for the welfare of the medical profession never happened in the State. In

the words of many of them, "There was no sickness worth reporting." This, though disheartening to the doctors, speaks well for the healthfulness of the State. We may, as a Board, perhaps take a modicum of credit for this condition of affairs. The establishment of local Boards of Health at its instigation; the appointment of Health Officers; the faithful performance of their duty; their valuable advice in sanitary matters to their constituents; their watchful care to stamp out contagious disease before it got a decent foothold, and the growing belief that sanitary science is not only a matter of public interest but of pecuniary profit, has combined to place our State upon a firm basis of sanitary reform. When our Legislature at its coming session amends our health laws and gives our Board a little more executive power, keeps our contagious disease fund replenished, and evinces the same interest in forwarding the views of the Board as it did during its last session, we may look forward with renewed assurance to our State's prosperity in all that appertains to its public health; and in this connection we cannot conclude this report without calling your attention to the marked aid given to the Board by

THE PRESS.

Without the aid of this magnetic molder of public opinion, your Secretary feels that his efforts in diffusing sanitary knowledge and sanitary requirements among the people, would have been comparatively futile. To its aid we owe in a great measure the success we have attained in an advisory capacity. It has, by its influence and in its columns, sustained us in every proposition for the public good; it has given free and general distribution to the "remarks" made in our "Monthly Circular," and has dealt leniently with us in its criticisms of the short comings necessarily imposed upon us, owing to the imperfect condition of our registration. We have to thank the press for its generous help in having our health laws amended; in having our Government quarantine stations erected; in showing to our legislators the indispensable necessity of having a contagious and infectious disease fund always on hand for the use of the Board whenever necessity arises for its use, and we look forward to its help at the next Legislature in having a State Sanitary Inspector appointed, a leper hospital erected, and, as important as any, a State Veterinary Surgeon appointed to take cognizance of the contagious and infectious diseases of cattle and horses that are now threatening to become epidemic in the State, to the imperilment of the health and lives of our citizens, and the great pecuniary loss of those engaged in the cattle industry. The frequency with which tuberculosis is now found among our dairy cows cannot but cause the utmost alarm among all classes of the community, as it has been indubitably shown that this dreadful disease, so universally fatal, can be communicated to the human family through the milk abstracted from a consumptive animal.

In this connection we would ask the public to read carefully the report of the veterinarian appointed by the Government to look after the cattle disease in this State, which we publish in this volume. It will then be seen that the necessity for the appointment of a State Veterinarian is urgent, and we look forward with confidence to the aid of the press in the efforts to be made by this Board to accomplish this most important

means of preserving our rising generation and the public generally from disease that is wholly preventable by proper legislation.

In concluding this report as the executive officer of the Board, I desire to acknowledge, with thanks, my personal obligations to my fellow members for the valuable assistance they have rendered me in the discharge of my duty, and for the counsel given so cheerfully in every emergency. I also desire to return my personal thanks to the gentlemen who have so generously contributed to this volume some original papers on leprosy, yellow fever, and other matters of sanitary interest to the public. Also, to our efficient and zealous Signal Service Officer, Sergeant Barwick, for his valuable meteorological services, which cannot fail to be interesting to all seeking California as a health resort. The State is indebted to Sergeant Barwick for his valuable report on our climate as a reliable exponent of its varied features and its suitability to all constitutions. We also submit the report of our fellow member, Dr. C. A. Ruggles, appointed by Governor Waterman as a committee of one to visit and report upon the charitable institutions drawing State aid. We also append to this report the expenses of the Board for two years, and also the expenditure for quarantine purposes, vouchers for which will be found on file in the Controller's office. We also append all the reports received from our County Hospitals, which are not as full or complete as they should be. We have likewise added the names and addresses of our correspondents, to whom we are indebted for the means of compiling our mortuary statistics. We also add, as a matter of interest, the *remarks* appended to our monthly circular; giving every month for two years the monthly deaths, the prevailing diseases, and such sanitary remarks as the occasion called for at the time.

All of which is respectfully submitted.

GERRARD G. TYRRELL, M.D.,
Permanent Secretary of the California State Board of Health.

REPORT OF COMMITTEE ON ORPHAN ASYLUMS AND ALMS- HOUSES DRAWING AID FROM THE STATE.

SAN JOAQUIN COUNTY HOSPITAL.

August 1, 1889, I visited the County Hospital of San Joaquin County. I was very courteously received by Mr. Charles Ward, the Superintendent, who afforded me every facility for a full and thorough examination of the institution. The hospital building is wooden, large, and commodious, and well adapted to the purpose intended. The wards are large and well ventilated by transoms, windows, and wall ventilators. The air is only tolerably good, it having too much of what is called "institution smell," owing, I think, to an imperfect system of sewerage. The institution is pleasantly located on the eastern border of the city of Stockton, far enough from the city to avoid the noise and turmoil, and yet easily accessible. The supply of potable water is obtained from deeply bored wells, cased with iron tubing, which effectually shuts off all possible surface contamination from cesspools and drains. It is abundant in quantity and excellent in quality. The building is well protected against fire, being connected by a large main with the city waterworks, and well furnished with hydrants and hose. At the time of my visit, there were seventy persons in the institution over sixty years of age, receiving aid from the State. From a personal interview with them, I find them well clothed, and as happy and contented as could possibly be expected under the circumstances. Upon a very careful and critical examination, the food was found to be of most excellent quality, no better bread to be found anywhere. The beds and bedding were subjected to a very rigid inspection, and were found to be very good, perfectly clean, and very comfortable. The clothing was all sufficient and good. That aristocratic feeling which I noticed last year, that the State patient was superior to the county patient, fostered by being allowed to occupy apartments separate from the county patients, has been effectually dissipated by a thorough commingling of both State and county proteges, so that idea of superiority no longer exists.

The sewerage is very bad. The waste is collected in a cesspool, and in spite of all efforts to prevent it, I am perfectly satisfied that sewer gas does get into the building. I have most earnestly called the attention of the Board of Supervisors to this bad condition of sewers, and am assured that active measures will be immediately instituted for its remedy. Hard work, privation, and in a majority of cases dissipation, have so run down the physical condition of these wards of the State, that the only opportunity of being serviceable to these unfortunates is in palliative rather than curative treatment. The county is very liberal and generous in providing care and attention for these people. The best of medical attendance is procured for them in the appointment of Dr. Gibbons, who visits them daily and as often as required. The total number of inmates is one hundred and four, for whose care one Superintendent and fourteen subordinates are appointed.

STOCKTON INSANE ASYLUM.

On August 1, 1889, I made an official visit to the State Insane Asylum at Stockton. The Superintendent, Dr. Rucker, courteously received me, and afforded me every opportunity for a close and thorough investigation of the institution, personally attending me through the buildings, showing and explaining everything desirable to know. The first thing that forcibly and very unpleasantly impressed itself on my mind was the overcrowded condition of the institution. There are nearly one thousand six hundred patients confined here, when by actual calculation, by measurement of cubic air space, there should be only about one thousand two hundred persons. If legislation is necessary to give a Chinaman five hundred feet of cubic space, surely these unfortunates deserve and should receive like attention. Since my last report, in which it was suggested that the medical staff was too small, an additional physician has been appointed, and arrangements have been made so that all the medical officers shall reside on the grounds, thus removing all possibility of an accident or sudden sickness occurring without access to immediate relief.

By means of the liberal appropriation of the last Legislature, very great and much needed improvements are being perfected. The south wall of the Female Department, that allowed the dampness to percolate through the porous brick, rendering the inner walls and ceiling in such condition as to produce much discomfort, as well as being dangerous to the health of the patients, has been painted with many coats, and that trouble has been averted. The air shafts alluded to in my last report, which terminated in the attic of the female asylum, have been carried through the roof, and the possibility of poisoning the sleepers there with foul air collected from the lower wards has been stopped. Proper representation having been made to the Directors that the extensive piggery maintained by the institution was an intolerable nuisance, endangering the health and disturbing the comfort of the neighbors near the institution, as well as depreciating the value of contiguous property, it was abolished, and by contract the swill is carried away from the building, thus, in that respect at least, very much improving the sanitary condition. The ventilation is tolerably good; in the older buildings it being by doors, windows, and transoms. In those built later it is first class, with all the modern appliances for carrying away bad air, and furnishing fresh and good. The sewerage system, as at the present time arranged, is not good. The plumbing of the older buildings is in a bad condition, much worn, and should be replaced by better and more modern apparatus. Much money has been expended in experimenting on an irrigation sewerage system, without the anticipated success. A contract has been let for constructing an output for all the sewage, which bids fair to be successful. I find the halls, sleeping-rooms, and dining-rooms in excellent state, all scrupulously clean, beds and mattresses good and comfortable, sheets and spreads and pillow cases snowy white, showing great care and attention in that line.

I made a very rigid inspection as to the food supply, visiting the bakery and kitchens. The flour used is extra in quality; the bread made from it is as good as can be found anywhere—sweet, light, and very nice. The meats are furnished by contracts, and are critically inspected by the proper officers before being received. Those that I saw were of

excellent quality in every particular. Upon visiting the kitchens, I found them in as good order as one could wish—neat and clean. The victuals were well cooked and in abundant quantities. A large dairy barn has been constructed, affording accommodations for seventy cows, thus enabling the management to furnish at a very small cost an abundant supply of milk, good and true, so much needed in an institution of this size and character. Large and commodious exercise yards have been constructed, in which the female patients enjoy the fresh air and apparent freedom from restraint. This plan should be continued, as it is productive of much good.

Many of the patients are very expert with the needle, and their work in embroidery is very fine and should be encouraged, as it serves as a means of diverting their minds from their gloomy surroundings into a more pleasant and cheerful channel.

The employment of the patients in workshops should be maintained to as great extent as possible, consistent with safety, as the importance of some properly adopted form of occupation as a means of cure cannot be overestimated, and the evil of the condition of idleness cannot be to fully condemned, many of the patients desiring to work, and take pride in showing willingness and ability to do so.

A close and thorough examination into the mental condition of the large number of persons confined in this institution, forcibly impressed me with the idea that there were more patients here than should be. It appears to me to be necessary that the people should be educated up to the fact that insanity is a disease, and that an insane hospital is a place for the treatment and cure of that disease, and not a receptacle for chronic demented, drunkards, and fools, sent there to avoid care and trouble to friends, and expense to the several counties whence they came. In fact, quite a considerable number of the inmates should be in county almshouses, and rigid legislation should compel a closer examination into their mental condition previous to commitment, so that the institution should not be burdened by those who should be cared for elsewhere.

HOME FOR FEEBLE-MINDED CHILDREN.

August 6, 1889, I visited the Home for Feeble-Minded Children at Santa Clara. As my visit was unexpected, I found everything in its natural daily routine. I was very cordially and courteously received by the Superintendent, Dr. Osborne, and his wife, who is Matron. Every possible facility was given me for a full and thorough examination of the institution and its inmates. There are one hundred and five persons at present here. The too much crowded condition of the building at once presented itself to my judgment. Were it not that probably larger and more commodious buildings will soon be erected, too strong condemnation of the present arrangement could not be uttered. The ventilation is by windows, doors, and transoms, and when the nature of the class of inmates in the building is considered, with the many involuntary accidents continually occurring, I think the system of ventilation is put to a very severe test, and is very successful. The closets were in excellent condition, freely flushed, all well trapped, very clean and free from odor. The dormitories were well ventilated, affording about five hundred cubic feet of air to each occupant, were neatly kept and per-

fectly clean. The bedsteads were of metal, and supplied with straw and hair mattresses; the sheets and pillow cases snowy white; blankets and counterpanes sufficient for comfort. I made a very thorough and severe examination as to the character of the food and the manner of cooking it. The flour is of the very best quality, and the bread made from it cannot be excelled in any place. The meats are of an excellent grade and quality, in sufficient quantity and well cooked.

The clothing of these poor unfortunates was everything that could be desired. The laundry, with its many modern improvements, is very severely taxed on account of the peculiar condition of this class of persons, yet it is all that could be required of it, so much so that I think the cleanliness of the clothing is quite remarkable. My attention was particularly called to the sewerage system of the institution. An imperfect plan of sewerage is worse than none, for by it we are lulled into false security.

The plan here adopted is as perfect and as good in design as the situation of the institution will permit. All the old plumbing had recently been removed from the building, and new work of the latest improved pattern substituted. I find this work to be not only mechanically, but hygienically first class. A Springfield gas machine has been recently set up, and affords not only a better light, but will prove a better safeguard against lamp-explosion and fire. The water supply is good and abundant, being pumped by a six horse-power steam engine into large tanks, thence distributed throughout the buildings and grounds.

The Home has been particularly favored by exemption from any epidemic or contagion. Even the diseases incident to childhood have been notably absent. When we consider the crowded condition of the dormitories, and the inferior, weakened vitalities of the children, too much credit cannot be given to the Superintendent and subordinates for the vigilant enforcement of the strictest cleanliness of person and quarters, by which in a very great measure disease has been averted. I most heartily indorse the sentiments and opinion of the Superintendent, Dr. Osborne, on the subject of epilepsy and the necessity of larger accommodations for this unfortunate class of patients. The most reliable authority says that in fully 60 per cent of all feeble-minded children could be traced the existence of epilepsy itself or as a complication. The epileptic should be segregated, and given close attention and special treatment.

It should be by itself on account of the dreadful, distressing, and frightening influence on those who would be compelled to witness the violent spasms and terrible contortions of the poor sufferer. I speak in the highest terms of commendation of the efforts of Dr. Osborne to thus separate them by placing them, especially at night, in wards or dormitories by themselves, with suitable attendants to look after them. As to the treatment of them from a medical point of view, the good results fully justify the variation from the usual orthodox plan. Too much attention had been paid to medicine and too little to hygiene; trusting too much to bromides, and too little to bathing, massage, and dieting, and the favorable results of this plan adopted by Dr. Osborne, warrant and justify a continuance of the same. It is much hoped that in the new buildings to be erected, especial accommodations, large and extensive, will be provided for the epileptic unfortunate, for there is no class that

deserves a deeper sympathy and a tenderer regard and pity than the epileptic.

INSANE ASYLUM AT AGNEWS.

August 6, 1889, I visited the Insane Asylum at Agnews, Santa Clara County. I regretted the absence of the Acting Superintendent, but was very kindly received by the Steward, who afforded me every facility for a thorough examination of the institution and its surroundings. The supply of water is everything that could be desired, both as to quantity and quality. There are seven flowing artesian wells, capable of supplying more than one million gallons every twenty-four hours. The water is pure and soft, and eminently fitted for cooking, washing, and drinking purposes. By a judicious arrangement of tanks, hydrants, and hose, and a well drilled fire department, the danger from fire is reduced to a minimum. The ventilation of the building is very good, which, with perfect cleanliness, renders the air all that could be desired. In passing from the outdoor air into any of the halls, where were sitting or walking many patients, no odor was perceptible, giving me thereby the proof of perfect ventilation. In bed-rooms, dining-rooms, and everywhere, I tested the efficiency of the method of ventilation and found it good.

The sewage of the institution is conveyed by an eight-inch vitrified pipe to the Guadalupe Creek, a distance of nearly a mile, far enough away not to be troublesome nor dangerous to the asylum, but must be very objectionable to residents in that vicinity. Attention should be given to those objections and a permanent sewer laid to the tide water of the bay, some four miles distant. I was much pleased with the method adopted to prevent any possible return to the building of sewer gas. The main pipe being connected with the tall chimney of the furnace, renders it very easy to dispose of any gas by its being consumed by the intense heat of the chimney.

The Hospital farm, containing two hundred and seventy-six acres, is judiciously divided into tracts for production of hay, fruit, and vegetables, and pasturage for dairy cows. I made a very extended and critical examination into the food supply. It was of first class character. The flour was of the very best quality; the bread was as good as could be made anywhere. The meats were good, freshly supplied in large quantities, and well cooked.

My visit being unannounced and unexpected, everything must have been found as kept in daily routine. I found the corridors, halls, and rooms in all their parts scrupulously clean. The beds and bedding in similar condition. The water-closets, sinks, basins, and urinals were in good, clean condition. It is very unfortunate, that on account of lack of appropriation, there is such an absence of fences and inclosures in which these poor unfortunates can have the very necessary outdoor exercise, as the continued confinement to the wards must necessarily be injurious to their physical as well as mental condition. I am informed that this matter will be remedied as soon as the appropriation is available. Much has been said by the daily press and others in relation to the sanitary condition of the location of this institution. I made a very careful examination of the patients, and diligent inquiry of the medical attendants, as to the presence of malaria and its injurious effects,

but saw nothing and heard nothing to warrant the belief that the location had any bad effects on the inmates.

STATE NORMAL SCHOOL, SAN JOSÉ.

August 7, 1889, I visited the State Normal School at San José. I made a very poor selection as to time for my examination, as it was vacation, and the building was in complete charge of the painters and kalsominers. As thorough an examination as was possible was made as to ventilation, water supply, and sewerage. The ventilation is good, all the modern and approved apparatus being used. The water supply is good in quality and abundant in quantity. It is pumped into tanks and made available for fire purposes as well as drinking use. The lavatories were in an excellent condition. The water-closets clean and tidy, well piped, and trapped. The sewage of the institution is well cared for, the system connecting with that of the city of San José.

STATE NORMAL SCHOOL, LOS ANGELES.

August 13, 1889, accompanied by Dr. H. S. Orme, President of the State Board of Health, I made a visit for sanitary inspection to the State Normal School at Los Angeles. We found everything in most excellent condition. The ventilation is very good. The rooms are large and airy, and well supplied with windows and transoms. The water supply is from the city waterworks, is very good, and abundant. The sewerage system is connected with the system of the city, and is good and effective. The lavatories, water-closets, and urinals are all kept in excellent, clean, and neat condition. As our visit was unannounced and unexpected, of course no opportunity was given for preparation, and I am free to give Principal More credit for having the building in his charge in a most excellent sanitary condition.

STATE NORMAL SCHOOL, CHICO.

August 22, 1889, I visited the State Normal School at Chico. I was here, as elsewhere, cordially received by Principal Allen and Vice-Principal Ritter, who afforded every opportunity for a very thorough and critical examination. It would have been unfair to have subjected this institution to a very rigid inspection, because it was in an unfinished condition—still being in the hands of carpenters, painters, and other mechanics. The building is pleasantly situated just on the outskirts of the town, very easy of access. The style of architecture is pleasing to the eye, and its internal arrangement very commodious and suitable for the uses for which it was designed. When the surrounding grounds are completely arranged, it will show great credit to the State, to the architect, and to the builders. The ventilation is as near perfection as it is possible to get it; it being accomplished by windows, doors, transoms, and air-shafts.

The rooms are all large, well supplied with light and fresh air. The lavatories and water-closets are in most excellent order as relates to piping and trapping, and so arranged that with very little trouble they are capable of being kept in a perfect sanitary condition.

The sewage is collected in a large cesspool situated at a considerable

distance from the building. Abundant arrangements can be made for the escape of sewer gas through shafts extending far above the house. I was much interested, as well as pleased, to find the water-closets in an annex sufficiently separate from the main building as to fulfill all sanitary requirements. From my many visits to the public institutions of the State, I am positively brought to this conclusion, that if this plan of the Normal School building at Chico was generally adopted by architects designing public buildings, much of the unsanitary and disease-producing agents would be very much avoided. The water-closets in many of our public buildings are too intimately related to the main house, and this institution might well serve as an example for future use as to what ought to be done and what can be done. The water supply is from the Holly Waterworks of the town. It is very good as to quality and abundant in quantity. I suggested that large tanks should be maintained, so that in case of an accident to the water-supplying apparatus, a certain amount would always be available.

STATE PRISON AT FOLSOM.

I visited the State Prison at Folsom August 24, 1889, and was very cordially and hospitably received and entertained by the Warden, Hon. Charles Aull. I made a very rigid examination of the prison, in which I was much assisted by Deputy Warden Robinson, who accompanied me and cheerfully showed me all and everything I desired to see. I am free to admit that I was prejudiced against the sanitary condition of this institution, as the oft-repeated assertion had reached my attention that the location of the prison was a very unhealthy one, and I was prepared to find both officers and convicts more or less affected by malaria and its concomitant diseases. Therefore, I was determined to give it the closest scrutiny and most rigid examination, and I freely admit in general terms that quite the contrary is the result of my inspection. The death rate is lower, and excuses from labor on account of sickness are less than in any public institution with which I am acquainted. I made a very close inspection of all the convicts, and I was most agreeably surprised by the total exemptions of sickly appearances. They all seemed hale, hearty, and well fed, and considering all the surrounding circumstances, I might say, happy also. The cells were inspected and were found in a very good condition—perfectly clean and well ventilated. In fact, all of the modern appliances have been utilized to give pure air in liberal quantities to corridors and cells. The raising of the wall four feet, and the addition of a row of apertures near the roof, has done very much to improve the ventilation, and in a measure to account for the healthful condition of the convicts. The fact that in an institution containing over five hundred persons, there is a hospital with only one patient, speaks volumes in favor of the perfect sanitary condition of this prison.

The beds were good and comfortable. The sewerage of the institution is not as good as it should be; but I am assured by the Warden that very soon much improvement will take place in that respect; the present clumsy system will be replaced by smaller pipes of ironstone, with all the proper traps and cut-offs, so that it will become impossible for sewer gas to enter the building.

The water supply is good and abundant, being pumped from the

American River and stored in tanks for distribution through the institution and the grounds.

I made a thorough examination into the food supply and the manner of cooking. The flour was excellent; the bread from it was found to be as good as could be found at any first class hotel. The meats were very good and well cooked.

NAPA INSANE ASYLUM.

August 28, 1889, I made an official visit to Napa, to make a sanitary inspection of the State Insane Asylum. I am under many obligations to Dr. Wilkins, the Superintendent, for the kind and hospitable reception extended to me; also to Dr. Hatch, Assistant Physician, for like courtesy shown by him. Every opportunity was afforded me for a close and rigid examination of the institution and its inmates. The first and very deep impression made on my mind was the wisdom of the Commissioners who selected the site of the Napa Asylum. Its nearness to San Francisco, the easy means of transportation to and from all important localities, the healthfulness of the climate, and the abundant water supply, all demonstrate the sagacity and good judgment of the locators. The institution is situated forty feet above the river, affording an excellent fall for sewage, the whole of which is utilized in an irrigation scheme. I was somewhat prejudiced against the plan of so disposing of the sewage, but upon a very critical examination into all its workings, particularly at the leeward side of the field thus irrigated, I am free to say that my opposition was speedily removed. By judicious purchases of surrounding tracts of land in rear of the institution the watershed has become extensive, and much labor, systematically conducted, has developed a water supply of unexpected quantity and of immense value. By the aid of this great supply of water the sewerage question is very simple. The continuous flushing of the sewer pipes has rendered the poisoning by sewer gas an impossibility. A reservoir for storing water for protection against fire has been constructed at a distance of a quarter of a mile in the rear of the building, and at an elevation equal to that of the clock in the central tower. It has a capacity of two millions of gallons. Large tanks for storing water are placed in each of the towers of the building, and thus the interior as well as the exterior of this immense structure is well provided with fire-extinguishing devices.

I was much surprised by Dr. Wilkins, who gave for my especial benefit an exhibition drill of the fire department attached to the institution. In an incredibly short time after an alarm of fire was turned in two large streams were being played upon the building at a pressure of sixty-five pounds.

As far as the destructive influence of sewer gas and fire are concerned, I think the water supply sufficient to antagonize both. A large dairy is maintained, affording a supply of milk sufficiently large for the institution.

The great supply of water for irrigation purposes allows the raising of much fruit and vegetables. Many fowls are raised, but not enough to supply the great demand for eggs, the monthly consumption being over one thousand dozen.

The food was most closely examined, and found in exceedingly satisfactory condition; the flour is extra in grade, and the bread made from it all that could be wished. The meats are thoroughly inspected before

reception, and what I saw were of first quality. The kitchens were visited, and found to be in excellent condition as to neatness and cleanliness. The ventilation is very good.

The air in halls, corridors, and sleeping-rooms is free from anything unpleasant or unhealthy. The water-closets and urinals are in first class order, the free supply of water rendering it very easy to keep them clean and free from any ammoniacal exhalation. The sleeping-rooms are in first rate order; the beds and mattresses very comfortable, and clothing was clean in every particular. I was much pleased to see so much outdoor exercise, both for physical and mental benefit, the apparent or supposed freedom from restraint doing so much to detract the patient's mind from the gloomy, melancholy surroundings to a more cheerful and pleasant atmosphere. My attention was called to the construction of the two infirmaries in which the insane, otherwise sick patients, can be comfortably kept outside of a ward of noisy patients and disturbing elements. The clothing of the patients, which is furnished by the State, is very good and serviceable. I have arrived at the same conclusion in regard to the crowded condition of this institution, as I did at Stockton. There are many here who ought not to be here, who should either be kept at home by friends, or in the hospitals or almshouses of the counties whence they came.

STATE PRISON AT SAN QUENTIN.

September 12, 1889, I visited the State Prison at San Quentin. On account of the illness of General McComb, the Warden, I was deprived of his valuable assistance in making my examination, but through the kindness of Dr. Durant, the Resident Physician, I was enabled to make my visit very satisfactory, as I was freely shown everything in and around the prison that was desirable or necessary to be informed about. The first thing that impressed my mind was the antiquated appearance of the buildings, and when I consider the fact that for nearly forty years they have been densely populated with all kinds and conditions of humanity, I could but think that, from a sanitary point of view, it would be a good thing for the State if these old affairs could be completely wiped out and replaced with newer and better ones. The greatest care and attention are very necessary to keep them in a decently healthy condition. As to ventilation and sewerage, all is done that can be done to make them efficient. The food is very good; meats and bread I think, from a personal examination, to be of first quality, and well cooked and prepared for the table. The bakery and kitchen were closely inspected, and were found to be in a very satisfactory condition.

It being the dinner hour, I was afforded an opportunity to examine personally each prisoner as he entered the dining-hall. The physical appearance of the majority was very fair, but of the many Mexican and Indian convicts, and not a few of other nationalities, I was convinced that confinement was doing them much injury. They exhibited a pulmonary and scrofulous condition that never does well in close quarters. After a very close and rigid examination of the condition of this class of convicts, and a free and full discussion of the subject with Dr. Durant, I was led to the conviction that in the cause of humanity, persons convicted of crime, previous to a sentence to a State Prison, should be examined as to the existence of any pulmonary disease, or a tendency to

it, by heredity or otherwise, and if such disease did exist or was likely to develop, such person should not be sentenced to San Quentin. I firmly believe that the unsanitary condition of the prison, together with its atmospheric surroundings, does much to develop tubercular disease, if it does not actually produce it. According to the report and experience of Dr. Durant, Mexicans and Indians suffer the most by this disease. They stand confinement very illy; more than one half of the hospital patients are of this class. In fact, the death report shows that for the fiscal year out of thirty-two deaths, fifteen were from consumption and six from scrofula. I cannot better express my convictions on this subject than by quoting the language of Dr. Durant, whose experience is large and extensive and of much value. He says: "The average of deaths is large, much larger than at Folsom, because we have a different element to deal with both in climate and material. While the climate at Folsom is warm and dry and preëminently suited to prolong the life of the consumptive, the moist climate of this place (San Quentin) militates against and causes death in a short time."

The State Board of Health, acting under those suggestions and convictions, has issued a circular letter to the Superior Judges of the State, requesting them in sentencing criminals to put these suggestions into practical effect. Much improvements have been made in arrangement and construction of water-closets by adding ventilators and giving them more effective flushing by an increased amount of water supply; so that the danger of contamination is much lessened. Very necessary improvements have been made in the bathing system, so that now there is no prisoner who does not bathe at least once a week, and some oftener. Great care and attention to cleanliness have rendered the general health fairly good. It is thought that the improved water-closet system has had much to do away, in a great degree at least, with the malaria with which they had to contend.

DEAF AND DUMB AND BLIND INSTITUTION AT BERKELEY.

September 13, 1889, I visited the Deaf and Dumb and Blind Institution at Berkeley. I much regretted that limited time compelled a hasty examination of this magnificent charity. I was cordially received by the Superintendent, Professor Wilkinson, who, with much earnestness and commendable pride, showed me over the buildings and brought me in personal contact with all the officers and scholars. The inspection of the inmates showed them to be in a most gratifying, healthy condition, there being at the time of my visit no sickness in the school. An epidemic of measles had visited the institution, following its usual course, and remaining as long as there was material to support it, but leaving no bad results. The most unfortunate of its results was the interruption of the school duties for over a month.

The water supply of the institution is very deficient, but it is hoped that by successful explorations by tunneling into neighboring hills and liberal appropriations by the Legislature, a water stratum may be struck which will furnish the much needed amount. The ventilation of the buildings, I might say, without exaggeration, is perfect. The most modern and improved appliances are in use, rendering the air as pure as it is possible to be. The school-rooms and dormitories are all large, airy, and well provided with ventilating apparatus. I was much pleased

with the great care and precaution taken, and means provided for escape if a fire should occur. Instead of the usual fire escapes, such as are commonly seen, stone towers at the ends of the dormitories inclose circular stairways of stone, by which, in case of necessity, the pupils may pass out of the building on the upper floors and reach the ground in safety.

A very good arrangement in the girls' dormitory attracted my attention. The dormitory was divided off into alcoves by wooden partitions that did not reach the ceiling, so that while a certain degree of exclusiveness and privacy was maintained, the free and full enjoyment of a plentiful supply of good, fresh air was not interfered with. While each girl had a private sleeping apartment, which she could decorate and make it as home-like as she desired, yet all of them are in the same room. I must heartily approve the plan of the air shafts in the walls, the air being heated and rarified in each shaft by a burning gas jet, by which a continuous current of cold air is maintained and the circulation made perfect. A very rigid examination of the food was made. The flour was extra in quality, the bread nice, light, and excellent. The meats were of the very best kind, with an accompanying amount of vegetables of the season.

The kitchen is a model of neatness and adaptation to its intended purposes. Connected with the institution is a gymnasium, well supplied with Sargents' apparatus. Much good is derived from this branch of exercise in strengthening and developing the physical condition of the pupils. The water-closets, urinals, and lavatories are in first class order, the plumbing in excellent condition, and the whole so arranged as to be separate from the building, thus rendering it almost impossible for sewer gas to enter the house. The system of sewerage is connected with that of the town of Berkeley. The sleeping-rooms are all well supplied with spring and hair mattresses, with blankets and sheets and pillow cases, neat and clean. Quite extensive additional improvements are in progress, and when complete the great usefulness of this grand charity will be much increased. In conclusion I wish to say that, though my duty was simply to inquire into the sanitary condition of the institution, I was much interested by the exhibition of the proficiency in the different exercises, as shown me under direction of Professor Wilkinson, and it affords me much pleasure to say that from a sanitary standpoint it is the model institution of the State, in which every citizen would take pride if visited personally, instead of relying upon official reports of others.

Respectfully submitted.

C. A. RUGGLES, M.D.

REPORT OF DELEGATE DR. C. A. RUGGLES TO NATIONAL CONFERENCE OF STATE BOARDS OF HEALTH.

To the President and members of the State Board of Health of California:

GENTLEMEN: With a high appreciation of the honor conferred upon me by my election to represent you in the National Conference of State Boards of Health, I most respectfully report that I attended the conference held at Nashville, Tenn., May 19, 1890. It met in the Senate chamber of the Capitol building at 10 A. M. Monday. On roll call eighteen States were represented. I am assured that an increased interest is being manifested in these meetings by sanitarians, as this was the most interesting and best attended conference since its inception. After the introductory address by the President, Dr. McCormack, of Kentucky, the regular order of business, which was printed and placed on the desk of each member, was entered upon.

The first proposition was that offered by the State Board of Health of Michigan, relating to the best method of disseminating public health knowledge. Nearly all of the members participated in the discussion. While all admitted the absolute necessity of our annual and biennial reports for historical and statistical references, yet it was generally conceded that the public should be more and better educated in the knowledge of those diseases of contagious nature, such as diphtheria, scarlet fever, and smallpox, both as to their character and manner of transmission, being an endeavor to prevent rather than to cure. The absolute necessity and practicability of thus reaching the masses were ably discussed, and while there was no attempt to disparage or belittle the present means of communication with the public by most State Boards of Health, the general opinion was that more could and ought to be done. Among the many good things suggested, the most feasible was the frequent issuance of small pamphlets or articles on such diseases as might at the time be prevalent. The local press was highly and very deservedly spoken of as an excellent medium through which much important information and instruction could be communicated by members of local Boards of Health in a sanitary column of the daily or weekly papers. Particular stress was placed upon the point of instructing the people how to properly disinfect after the prevalence of any of these contagious diseases. The great good derived from holding sanitary conventions under the charge of the State or local Boards of Health was very impressively mentioned, and a continuance of them advised as a means of promoting and developing popular interest in sanitary matters.

Quite an animated discussion ensued on the Interstate Quarantine law, approved March 28, 1890. Much was said that I think had better not have been said. It was finally concluded that much good judgment would be necessary to prevent confusion and unpleasant collision among State Boards of Health.

Proposition No. 4 was: "What steps should the United States take to

prevent the introduction of leprosy into this country?" At a former conference a special committee, consisting of Drs. Lee, of Pennsylvania, Bryce, of Ontario, Canada, and Hoegh, of Wisconsin, was appointed, to which was referred the general subject of leprosy. Dr. Lee, Chairman of the committee, read a majority report, holding that leprosy is contagious, and declared as a damnable heresy the dictum of the Royal College of Physicians and Surgeons of Great Britain to the opposite effect. Dr. Reeve, of Wisconsin, in the absence of Dr. Hoegh, read a minority report, advancing the opinion that the danger of contagion was very much exaggerated in the majority report, and that it was not sufficiently great to justify resorting to such unnecessarily harsh and severe measures which so disregarded the ordinary rights of diseased individuals.

By permission, I read copious extracts from an extensive and exhaustive paper on the subject, written by Dr. Orme, President of the State Board of Health of California, which confirmed and indorsed the sentiments expressed in the majority report in every particular. Nearly all the members participated in the discussion, and the conclusion finally arrived at was that the State and local Boards of Health could be safely intrusted with the care and regulation of the disease, and that the action of the United States Government in the premises was sufficient.

Proposition No. 5, relating to the use of moisture and sulphur burned for the purpose of disinfection of rooms after the occurrence of diphtheria, scarlet fever, and smallpox, was ably and fully discussed, and the preponderance of opinion was in favor of using a spray of moisture with burning sulphur for the aforesaid purpose. But Dr. Rutherford, delegate from Texas, and State Health Officer, who had had a very extensive opportunity for observation on the Rio Grande in his official attendance on smallpox, expressed his positive and complete want of confidence in the proposed method of disinfection. He relied wholly and entirely upon fire and chlorine gas, obtained very easily and cheaply from black oxide of manganese, common salt, and muriatic or sulphuric acid. To which statement I most cheerfully and emphatically gave my indorsement, founded on an experience of many years as Health Officer of Stockton.

Under the head of miscellaneous business I offered the resolution passed by this Board of Health, in which it was deemed advisable that the conference of State Boards of Health hereafter should hold its annual session in connection with the American Public Health Association. I advocated its adoption to the best of my ability, but, excepting the State of Maine, California was alone in the advocacy of the resolution, the conference declining to agree to it. So, for the present, its meetings will be held simultaneous with the American Medical Association. The policy of such union I very much question. I think an institution of the importance of the National Conference of State Boards of Health, with its grand capabilities of doing much good in sanitary matters, should command respect and interest sufficient to go alone and independent of any and all other institutions. The greater naturally absorbs the lesser, and I was forcibly and painfully made aware of that fact at our May meeting.

There was a disposition to hurry matters, as if a prolonged session might possibly interfere with the interests and welfare of the larger body. The query presented by this Board, "How to prevent the contam-

ination of potable water?" was discussed by many of the delegates, as much as the limited time would allow, and no definite conclusion was arrived at. Dr. Bryce, of Ontario, Canada, read an exceedingly interesting paper, entitled, "Preservation of our Forests as a Sanitary Measure." It elicited much interest, and was referred to a special committee, who reported and recommended, among many other good measures, that this conference respectfully urges upon the Sub-Committee on Forestry, of the Committee on Public Domains, of the Congress of the United States, to pass such laws as shall check the reckless destruction of trees on public lands.

While en route to Nashville, I received, what I deemed very reliable information, that at Las Cruces, near the border line of Arizona, there existed quite an extensive number of cases of smallpox. That the authorities were taking no precautions against the dissemination of the disease. That the Mexican population took no method of avoiding it, or care about spreading it.

As that locality was near the line of railroad going through Arizona by two entrances to California; as Southern California, particularly Los Angeles City and County, had been but a short time previously visited by an epidemic of that disease, which the health authorities believed to have arisen from the same source, which was finally stamped out at an expenditure of much money, and with a very great loss to the business relations of that city, I believed it my duty to notify the State Board of Health of this exact condition of affairs, at the same time advising the placing of Inspectors at border line of Arizona and New Mexico, where the Atlantic and Pacific and Southern Pacific enter Arizona.

As soon as the conference at Nashville adjourned, I hastened to Washington and placed what I believed to be the exact condition of affairs before President Harrison and Surgeon-General Hamilton, U. S. Marine Hospital Service. I received from both gentlemen an assurance that all possible relief and assistance would be immediately rendered.

I wish to make mention of the valuable assistance I received from Congressmen Biggs and Clunie, who accompanied me to visit the President and Surgeon-General, indorsing by their official positions all I might ask for to protect California from a repetition of an invasion of smallpox, which but recently had cost so dearly to eradicate.

Respectfully submitted.

C. A. RUGGLES, M.D.

REPORT OF INSPECTOR OF CATTLE DISEASE IN SOUTHERN CALIFORNIA.

SAN FRANCISCO, December 17, 1888.

DR. G. G. TYRRELL, *Secretary State Board of Health, Sacramento, Cal.:*

In compliance with instructions from you as representative of the State Board of Health, and Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, I proceeded to investigate the outbreak of disease among the cattle of San Diego County, and have the honor to submit the following results of my investigation:

On arrival at San Diego I found that my written orders, etc., from Washington had not yet arrived, so I thought it the better plan to inform myself on the following points:

First—The direction in which the said diseases were supposed to exist.

Second—The ranches on which said cattle were supposed to be dying.

Third—The health and condition of cattle, etc., in San Diego City and its surroundings.

In the course of my inquiries I came in contact with the following gentlemen, and elicited the appended information:

The first gentleman I interviewed was Mr. George Sellwyn, of the firm of Sellwyn & Alison, wholesale butchers. He said: "I have been twenty-three years in this county, and have known of the existence of disease in this county for the past sixteen years, being worse in the last three or four years in the neighborhood of San Diego. Some seasons the disease predominates in one locality more than in another. This year, 1888, the disease has manifested itself, principally, at Warner's Ranch. This ranch is owned by ex-Governor Downey of California." He also stated that cattle brought from the mountains in the interior of San Diego County during the dry season of the year, to San Diego City, or any part of the coast, are, from ten to fifteen days after arrival, subject to disease. The disease is of frequent occurrence, and the cattle are slaughtered and used for consumption. He next described the symptoms of this disease, and the post mortem lesions, both of which correspond to those of anthrax and southern fever, but more particularly the latter.

In the course of conversation I obtained the following information about the hogs: He stated that a disease among hogs made its appearance about two years ago in the pens around the slaughter houses, although the disease has not been so marked, and the mortality less during the last six months. In 1887, Mr. Sellwyn said the mortality reached the enormous number of one thousand head. I asked him if the disease existed at the present moment, and he said he suspected it did. We then drove out to some hog pens near his slaughter house, and I found some hogs running around loose which exhibited symptoms of the last stages of swine plague, and others in the pens with the characteristic cough. At my request Mr. Sellwyn slaughtered one, and I made

an autopsy, finding the post mortem lesions those of swine plague. I recommended that he, Mr. Sellwyn, should destroy the whole of the hogs, which belonged to a man to whom he rented the premises.

Mr. Sellwyn further remarked that big-jaw, or actinomycosis, was occasionally seen, and that black-leg, or symptomatic anthrax, was very prevalent a few years ago, but of late years it has been on the decline. Scab in sheep is very prevalent. Mr. Sellwyn stated his annual loss from the prevalent cattle disease was \$500.

The next gentleman I interviewed was Mr. Hardy, wholesale butcher, San Diego. He informed me that he shipped some cattle in April and May, 1888, to San Diego, and pastured them in the El Cajon Valley, fifteen miles from San Diego; the cattle appeared healthy until the month of August, when about 2 per cent died. I am informed that the remainder of these cattle were slaughtered in San Diego.

Mr. Hardy also informed me that Mr. Stratton's cattle, also in the El Cajon Valley, began to die, when he sold the remainder to him (Mr. Hardy), who found, on slaughtering them, that two were diseased, the spleens being three times their natural size, and of a dark color on section. The livers were of a brick-red color, and covered with yellow streaks like straws laid across. The kidneys were also diseased, and the flesh when dressed was of a bright yellowish red color.

Mr. Hardy further stated that at least 50 per cent of the cattle within from ten to thirty miles from this coast, in San Diego County, take this sickness, and about 20 per cent of the sick animals die, and the disease appears to be worse between the months of July and December.

When asked about swine plague, Mr. Hardy corroborated Mr. Sellwyn's statement, and stated that he himself, about eighteen months ago, lost between five and six hundred hogs, which he valued at \$2,500.

The next gentleman was a Mr. Cassidy. He stated that he had sold his ranch in 1887, but during the preceding ten years his average mortality was about 20 per cent, the money value of which was about \$1,000 per annum. He also mentioned the fact that one year his cattle died, and his neighbors' did not, although they were only separated by a wire fence, and that next year his neighbors' died and his did not. Mr. Cassidy also observed the fact that cattle brought from the north to this county do not thrive, but that calves and yearlings thrive and do well; also, that mountain cattle brought to the coast die, but that coast cattle taken to the mountains do well.

The next gentleman was Thomas Alvarado, from Rancho Mons-Errupe. He noticed disease on his ranch about ten years ago, and it was, in his opinion, brought in by cattle from Lower California and Mexico. He lost about sixty head last year, and his neighbor, H. H. Green, lost over one hundred head. The cause of death, in his opinion, was due to southern fever. He first noticed this disease about eighteen years ago, directly after Judge Weatherby brought in two hundred cows from Arizona, and gave them to C. Thomas, on shares, at the Hemit Valley. In his opinion, since that importation the disease originated. His brother, D. Alvarado, of Cuero, lost over sixty head last year, and considered his losses due to southern fever.

My written instructions having arrived, I left next day for Warner's Ranch. I may here state that I had the greatest difficulty in getting my questions answered, and a good many of the answers were calculated to mislead and perplex me. It was almost impossible in many

instances to ascertain any data. On arrival at El Cajon I heard that there was at present no deaths nor sickness among the cattle. On the Santa Marie Ranch I found they had lost a few head, and here I interviewed a Mr. Johnstone, who lives seven miles above this ranch, and he informed me that he had, in 1883, lost twenty head of cattle out of a total of sixty head, and attributed his loss to southern fever. I arrived at Balleno, and left next morning for Warner's Ranch, and on my way I passed through the Santa Ysabel Ranch, which adjoins Warner's, and I found they had lost nine or ten head of yearlings with black-leg.

On arrival at Warner's Ranch, I found Mr. Linton, the manager, was not at home, having gone to Julian, intending to continue his journey next day to San Diego. In course of conversation with one of his men, I was informed that they had lost over one hundred head, and also that they had ceased dying a few days before my arrival, and shortly after the first frost, and therefore I could not hold an autopsy. I decided to go on to Julian and see the manager, so that I could personally interview him. Mr. Linton confirmed the statements made by the man I had seen in the morning; he also added that he purchased and brought some cattle from the San Felipe Ranch, which adjoins the Warner Ranch. A little later ex-Governor Downey of California, and owner of the Warner Ranch, bought four hundred Chihuahua steers, shipped from Mexico to Colton by a man called Skusenbach, and said cattle were delivered by the aforesaid Skusenbach on the Warner Ranch, and a short time after their arrival the natives began to die. Mr. Linton ascribed as the cause of their death, the arrival of the San Felipe cattle. I found out, however, that the other half of the San Felipe cattle, which were bought by Jos. Marks, of Julian, and removed to San Bernardino, remained perfectly healthy, and as yet have caused no disease among the cattle at San Bernardino; whereas, some of the San Felipe cattle on the Warner Ranch died, as well as some of the Warner Ranch stock, shortly after the advent of the four hundred steers from Colton, none of which died.

Mr. Linton said the fattest and best animals went first, while others lingered for days, some of which recovered. On opening some of the dead cattle, he found the spleens enormously enlarged, and the livers enlarged and of a brick-red color, and the gall bladders enormously distended and full of dark green inspissated bile. He said there was an absence of any dark stain to the flesh, which was, if anything, brighter than usual. The Indians and half-breeds devoured the flesh of all that died without as yet having experienced any bad effects, which, in my opinion, could scarcely be possible had it been anthrax, as Mr. Linton was inclined to think. Mr. Linton owned to having lost one hundred head, but I am inclined to think he underestimated his loss, as his nephew informed Mr. Bishop, his neighbor, and one of his men, who informed me, that they had sold one hundred and fifty hides, and that others were missing they did not find, placing the loss, in his opinion, between one hundred and eighty and one hundred and ninety head.

From Julian I went to Cuyamaca, Governor Waterman's ranch, and on arrival was informed that a valuable bull had died that morning. It was buried, but I had it disinterred and made an autopsy, finding the post mortem lesions those of southern or Texas fever. I made a microscopical examination of the liver and spleen by means of cover-glass specimens. The microscopical examination confirmed the macro-

scopical diagnosis. The foreman, Mr. B. W. Carey, said: "We have lost in all twenty-one head. We shipped cattle from the Penasquitas Ranch, on the coast, to San Bernardino by car in April, 1888; they remained there three months. In July, 1888, we shipped them with others back to the Penasquitas Ranch. In about two weeks after their arrival two deaths occurred, and we started the cattle next day for the Cuyamaca Ranch, going through by way of Poway and El Cajon. On arrival at Cuyamaca, three died the same night. We had no deaths for a few days, and then two died. They all exhibited the same symptoms."

Mr. Stratton's cattle, pastured in the El Cajon Valley, commenced to die after Governor Waterman's passed through. I must refer you back to Mr. Hardy's testimony, in which he says he bought Mr. Stratton's cattle, and on slaughtering them found two showing the post mortem lesions of southern fever, and also that his own cattle pastured on the El Cajon commenced dying in August. Now, the Governor's cattle passed in the end of July. It would appear from this evidence, if correct, that the Governor's cattle were the means of causing the infection at Poway and El Cajon, and that they without a doubt carried the infection to the bull that died at Cuyamaca.

In connection with those cattle I must state that yearly deaths take place at the Penasquitas Ranch. It is a peculiar fact that none of the cattle shipped to San Bernardino from Penasquitas died, but that the deaths took place two weeks after their return to Penasquitas, with other cattle, which, I was informed by Governor Waterman's son, came from their San Bernardino dairy.

It is well known that deaths have occurred close to Colton, which is two miles from San Bernardino, from southern fever, and it may be that the Governor's cattle crossed a trail and became infected, or caught the contagion on the cars on their return to Penasquitas. But these, being native cattle, could not possibly infect Hardy's and Stratton's cattle, unless some southern cattle were mixed in the herd. It is also a fact that the bull that died at Cuyamaca was raised on the Cuyamaca Ranch, and that no deaths occurred until the arrival of the herd from Penasquitas. I am informed that the original stock of those two ranches was brought in by Colonel Taylor from New Mexico, Iowa, and Kansas. I also examined the remainder of the herd, and found only one sick cow, which was killed, and the post mortem revealed a case of tuberculosis.

Leaving Cuyamaca, I commenced to trace up the infection on Warner's Ranch, and, on my way, passed through the San Felipe Ranch, which adjoins Warner's, and found they had lost five head of cattle, and in one day thirty sheep, which the owner claimed died from eating of a certain weed, specimen of which is inclosed. He also informed me that black leg was of annual occurrence on his ranch. Leaving here, I passed through Warner's for the second time, and went through the center of the four hundred Chihuahua steers, all of which seemed in good condition, as were also most of the natives, no more deaths having occurred since my first visit. Taking up the trail of the Chihuahua steers, the first place I came to was Oak Grove, and Mr. Studebaker informed me that those Chihuahua steers passed through his place, and up to the present no deaths had occurred, but one of his cows was sick, exhibiting a prominent symptom of southern fever. I informed him what to give her. One of the Warner steers had mixed with his herd.

From here I proceeded to Temecula, and found that numerous cattle had died around the town. I interviewed the following gentlemen: Mr. E. J. Tolan, who stated that he lost one heifer three weeks after the Warner steers came through; two years ago he lost thirteen on the same trail. Mr. Nichols has lost ten or twelve head this year; Mr. Philip Casis has lost five head this year; Mr. Hutchinson has lost twenty head this year, and most of his herd has been sick. He opened some of those that died, and found the gall bladders enormously distended and full of dark, inspissated bile, and the spleens also enormously enlarged. All those he opened presented similar appearances. The first animal that died was his best and fattest cow, and it occurred about the middle of July, 1888. Previous to that some southern steers were seen in the hills, and two of them mixed with his herd, and were with them for several days. Mr. Linton, manager of Warner's Ranch, informed Mr. Hutchinson that those Chihuahua steers were scattered from Colton to his ranch, some thirty or forty being missing.

Mr. Gerber, at Nigger Cañon, lost ten head, some of those roving steers also having appeared around his place.

Mr. Brady, three miles from Temecula, lost fifteen head. He said that Warner's steers came through in August, and that his cattle died before they came through; and as Mr. Hutchinson's boys informed me they saw steers on the hills around Temecula as early as the sixth of July, they could not be stragglers from those that went through in August.

I now proceeded to the Santa Marguerita Ranch, when Mr. O'Neil informed me, concerning the Warner steers, that Mr. Skunsenbach brought them from Chihuahua, and pastured them on the Castile Ranch, fifteen miles from Colton, and sold them to ex-Governor Downey. He said: "I went to see those cattle, but declined to purchase them. On the twelfth of July, 1888, I delivered cattle to Hardy, of San Diego, and he informed me that he had seen stragglers (southern cattle) on the hills around Temecula." This seems to coincide with the date of the death of Mr. Hutchinson's first cow. He also said that Colonel Taylor brought cattle from Texas to Cuyamaca and Penasquitas two years ago, and some of those which were of a high grade died, the Texans, in his opinion, infecting them. Also, that they are killing Texas and New Mexico cattle continually in San Bernardino City. He stated his own losses had been about ten to fifteen head this fall, and attributed same to cinnabar poisoning and ticks.

From here I went to San Juan Capistrano and interviewed Mr. Marcus Foster. He said that Mr. O'Neil brought in cattle from Texas on to the Santa Marguerita Ranch, which adjoins his, and that said cattle broke down the fences and mixed with his, and he lost one hundred head. Next year, same thing occurred, and they mixed, as well as others he brought from Arizona, and he lost from eight hundred to one thousand head. This year, 1888, I have lost about one hundred head of cattle. I made an autopsy on this ranch, and found the cause of death to be southern fever. He further stated all the ranches below have been affected in a similar manner, and as we never had this disease before, it must have been brought in.

From this ranch I went to Colton, where the Warner steers were unshipped. I here interviewed Mr. Castile, owner of the Castile Ranch. He said: "Mr. Skunsenbach brought four hundred steers from Chihuahua to my ranch, fifteen miles from here, in June, 1888, and pastured them

on my ranch for two months, and then sold them to ex-Governor Downey; his son helped to deliver them on the Warner Ranch; deny losing any on the way. In September, 1887, I lost fifty-six dairy cows, worth \$3,000, and attribute this loss to the cattle being driven across my ranch and affecting it. This year I lost none."

I now proceeded to the Southern Pacific office at Colton, and the shipments of cattle to this point are as follows:

First—From Benson, Arizona; arrived May third, for Marcus Foster, San Juan Capistrano.

Second—From Tucson, Arizona; arrived April sixth, also for Marcus Foster.

Third—On March thirteenth, Skunsenbach shipped in one hundred and thirteen head of cattle, but they were slaughtered in Colton and San Bernardino.

I now went to the Santa Fe office at Colton, and found that Skunsenbach shipped four hundred head of Chihuahua cattle into Colton on June 6, 1888, and sent them down to the Castile Ranch, as already stated.

Having now obtained all the evidence, and with due regard to conflicting statements, no doubt purposely made in a great many cases, I drew the following conclusions concerning the outbreak of southern fever in San Diego County: That southern cattle have been shipped into Colton, and from there traveled by the following trails: That going to Warner's Ranch, and that going to Capistrano, and also by O'Neil's trail from San Gorgonio to Rancho Santa Marguerita; and that these cattle have infected the trails, and by that means the native cattle.

At the request of Dr. Orme, of Los Angeles, I made a short inspection in that city, and found it far from being in a satisfactory condition. I heard complaints from some of the veterinary surgeons that glandered horses were not destroyed, as they should be. In company with Dr. Whittlesey, veterinary surgeon, I visited Mr. W. W. Curtis, on Anderson Street, Los Angeles, and found he had lost three cows within one week, from what Dr. Whittlesey considered southern fever, and in which I agree with him, when the following facts are taken into consideration:

First—Scenton Bros., of the Orleans Market, ship in southern cattle.

Second—Said cattle are unloaded at the railroad yards, and driven ten miles to Scenton Bros.' yard, by way of the river bottom.

Third—Mr. W. W. Curtis' cows grazed right in this bottom where those cattle were driven. In view of these facts, and the scattered condition of the slaughter houses in Los Angeles, and to prevent such contagion, the animals ought to be unloaded in the slaughter yards, and said slaughter houses should be all in one place, and not scattered, as is the case in Los Angeles and San Diego. San Diego has the better facilities, as all the offal can be taken out to sea and dumped by means of a lighter.

I now proceeded to Hanford, Tulare County, and on arrival I interviewed Dr. J. A. Davidson. He said: "I examined some cattle two and one half miles from here, that were brought from the Salinas Valley, and put in a field of alfalfa, and about thirty days ago they commenced dying, after being three weeks on the alfalfa."

I next interviewed Mr. Motheral, and he said the cattle came from the Salinas Valley, and in two weeks after arrival began to die. On the way they passed through the Polly-Heilbron Ranch, where cattle have been dying this year in great numbers, and when frost came the mortality

ceased. He said: "I consider the disease to be southern fever, as it was identical in symptoms, course, and post mortem lesions with what I have seen in Florida and Mississippi."

I now went to Mr. Sanborn's, four miles from the city, and found E. J. Felton had lost nineteen head this year (1888); last year (1887), sixteen head; usually carries about forty head. This year they died about the first of September—on the advent of some cattle from the Coast Range in the month of August, 1888. The post mortem lesions, described by Mr. Felton, correspond to those of southern fever.

I now went to Mr. Sanborn's field and made an autopsy on a cow which was killed in the morning, and found nothing to indicate the acute stage of southern fever, but from the condition of the liver and gall bladder, it was either commencing or recovering from it. In the lungs I found the bronchial tubes full of the *strongylus microcus*, which causes parasitic bronchitis, and, from the number of animals coughing in the herd, I had no doubt others were afflicted, and told the boys what to give them.

I now made an autopsy on a calf, in same field, which had been dead two days, but as the weather was cool I was able to get the lesions well defined, except where the post mortem was on the under side, from gravitation. I found the lesions to be those of southern fever. I also made a microscopical examination of the spleen and liver, by means of cover-glass specimens, but could not find any signs of the bacillus of anthrax.

Mr. Sanborn said: I sold my hay to Polly, Heilbron & Co., to be fed on my ranch, and they brought one thousand four hundred head of cattle from their place, and about three days after arrival they commenced to die, and about four hundred and fifty died on the ranch before they left.

From the evidence taken at Hanford it can be seen that the Polly-Heilbron ranch was affected, and that the cattle reported dying by Dr. Davidson, according to Mr. Motheral, crossed this ranch, and in about three weeks commenced dying from southern fever, and again, the Polly-Heilbron cattle brought to Mr. Sanborn's died, and the post mortem lesions are identical with those of southern fever, as far as a post mortem made two days after death can be relied upon.

In view of this testimony, I can place the contagion among those cattle from Salinas in two places:

First—In the Salinas Valley. Before leaving I found that valley infected, in October, 1888.

Second—On the Polly-Heilbron grant, where the cattle have been dying this fall; and from the post mortem made at Sanborn's on their calf, I have only one opinion to advance, and that is, the cause of death was southern fever; and such being the case, was it not possible for the steers that came from Salinas to become infected when crossing that ranch?

As Mr. Biddle, of Hanford, informed me that the deaths around the county had ceased, and I could do nothing more, I left for San Francisco.

On the fourteenth of December Dr. Spencer reported the following: Mr. Granger, residing in the southern part of Santa Clara County, reported to him, Dr. Spencer, the death of two young horses in one week. The deaths were very sudden, and the diagnosis from the autopsies was

anthrax, and the history of the case is as follows: Hay was procured from Mr. O'Toole's ranch, where anthrax was known to exist, as Sargent's cattle died there of that disease this fall, and on opening the bales many of the same were found to contain parts of dead animals, and presumed to be parts of animals that had died of anthrax, and in this manner Dr. Spencer thought the contagion was carried to Mr. Granger's horses. The doctor also said that the county authorities failed to see the necessity of burning over the fields and carcasses on O'Toole's ranch when the Sargent cattle were known to die of anthrax.

Respectfully submitted.

THO. BOWHILL, M.R.C.V.S.,
Special Agent U. S. Bureau of Animal Industry.

REPORTS ON INDIGENT SICK IN COUNTY HOSPITALS.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the City and County Hospital, San Francisco, for the year ending June 30, 1890.

Total by each Disease -----	DISEASES.	No. Deaths by each Disease.	Total by each Disease -----	DISEASES.	No. Deaths by each Disease.
14	Abscess -----		14	Hypochondriasis -----	
1	Abscess, abdominal -----		16	Hysteria -----	
4	Abscess, mastoid -----		18	Iritis -----	
1	Abscess, maxillary -----		16	Lumbago -----	
4	Abscess, inguinal -----		26	Malingering -----	
3	Abscess, cervical -----		30	Measles -----	
5	Adenitis -----		6	Metritis -----	1
108	Alcoholism, acute -----	13	9	Nephritis -----	1
9	Alcoholism, chronic -----		52	Neuralgia -----	
13	Amputation, finger -----		9	Ophthalmia -----	
2	Amputation, foot -----		50	Orchitis -----	
3	Amputation, leg -----		6	Otorrhœa -----	
2	Amputation, hand -----		5	Ovaritis -----	
1	Amputation, toes -----		6	Pediculosis -----	
3	Amputation, thigh -----		17	Paralysis -----	
7	Anæmia -----		6	Paraplegia -----	
2	Anchylosis of elbow -----		14	Peritonitis -----	5
1	Anchylosis of hip -----		9	Pharyngitis -----	
1	Aneurism, abdominal -----		2	Phlegmons -----	
1	Aneurism, carotid -----		34	Pleurisy -----	
3	Aneurism, aorta -----		25	Phymosis -----	
2	Aortic obstruction -----		167	Pregnancy -----	
10	Abortion -----		7	Psoriasis -----	
91	Bronchitis -----	3	17	Sciatica -----	
35	Carcinoma -----	18	88	Sprains -----	
6	Cirrhosis of liver -----	5	29	Stricture, urethral -----	
7	Cerebro-spinal meningitis -----	1	13	Synovitis -----	
3	Diphtheria -----	2	118	Syphilis -----	
18	Erysipelas -----	1	9	Syphilis, secondary -----	
56	Fever, typhoid -----	18	4	Syphilis, tertiary -----	
122	Fever, malarial -----	1	5	Tabes dorsalis -----	1
75	Heart disease -----	37	8	Tonsillitis -----	
68	Pneumonia -----	31	4	Tuberculosis, testicle -----	
336	Phthisis -----	133	6	Trauma of spine -----	
3	Stricture, œsophagus -----	4	124	Ulcer, carious -----	
1	Septicæmia -----	2	8	Ulcer, varicose -----	
28	Senility -----	3	9	Varicose veins -----	
223	Rheumatism -----	3	10	Varicocele -----	
9	Rheumatism, syphilitic -----		35	Asthma -----	
27	Lacerated wounds -----		18	Epilepsy -----	
31	Contused wounds -----		32	Eczema -----	
69	Influenza -----		14	Dyspepsia -----	
7	Pneumonia, typhoid -----	6	36	Debility -----	
17	Hemiplegia -----	1	10	Diarrhœa -----	
22	Hernia -----				

Number of months reported..... 12
 Total on hand at commencement of year..... 505
 Total admitted..... 3,679

Discharged cured..... 1,508
 Discharged improved..... 1,538
 Died..... 404
 Remaining under treatment..... 352

Name and location of hospital: CITY AND COUNTY HOSPITAL, San Francisco, California.
Physician's name and Post Office address: J. H. HEALY, San Francisco, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Tehama County Hospital, for the year ending December 31, 1889.

Total by each Disease-----	DISEASES.	No. Deaths by each Disease.	Total by each Disease-----	DISEASES.	No. Deaths by each Disease.
---	Consumption -----	3	-----	Typhoid malarial fever-----	1
---	Typhoid pneumonia -----	2	-----	Dropsy -----	1

Number of months reported -----	12	Discharged -----	136
Total on hand at commencement of year -----	24	Died -----	7
Total admitted -----	148	Percentage of deaths -----	20½
Discharged cured -----	136	Remaining under treatment -----	29

Name and location of hospital: TEHAMA COUNTY HOSPITAL, Red Bluff, California.*Physician's name and Post Office address:* W. D. OLENDORF, Red Bluff, California.

Condition, location, sewerage, ventilation, and water supply, good. Physician's attendance, once every day.

The County Physician for 1889 has gone to the mountains, and will not be home for a couple of months.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Kern County Hospital, for the year ending December 31, 1889.

Total by each Disease-----	DISEASES.	No. Deaths by each Disease.	Total by each Disease-----	DISEASES.	No. Deaths by each Disease.
39	Malarial fever -----	1	5	Dysentery -----	---
17	Malaria -----	---	1	Cancer -----	---
22	Rheumatism -----	---	3	Typhoid malaria -----	---
3	Asthma -----	1	3	Ulcer -----	---
8	Paralysis -----	2	7	Whisky disease -----	1
3	Heart disease -----	1	5	Throat disease -----	---
8	Consumption -----	3	3	Shot wounds -----	2
7	Syphilis -----	1	5	Dyspepsia -----	---
7	Pneumonia -----	1	6	Erysipelas -----	---
5	Bronchitis -----	---	1	Piles -----	---
2	Typhoid pneumonia -----	1	2	Amputations -----	---
15	General debility -----	3	2	Hemorrhage of lungs -----	---
6	Fractured limbs -----	---	2	Morphine habit -----	1
1	Fistula -----	---	3	Catarrh -----	---

There are a number of admissions of trifling diseases not mentioned in this report.

Number of months reported -----	12	Discharged cured -----	157
Total on hand at commencement of year -----	19	Died -----	18
Total admitted -----	206	Percentage of deaths -----	15
		Remaining under treatment -----	20

Name and location of hospital: BAKERSFIELD, Kern County, California.*Physician's name and Post Office address:* L. S. ROGERS, Bakersfield, California.

The Kern County Hospital is situated half a mile southwest of the center part of the town of Bakersfield, and occupies a building area of seventy-five feet by one hundred and fifteen feet. There is a park, comprising two acres, for garden and recreation grounds. The water supply is adequate and sufficient, and is supplied by the Bakersfield Water Company. The ventilation of hospital is sufficient. The supplies are furnished through the Superintendent, on charges against the county, without any restriction on the part

of the Board of Supervisors. The medical attendants consist of one Visiting Physician, one Steward, and two nurses.

The hospital consists of two wards, twenty by thirty feet each, containing each eight beds; two double rooms, fifteen by twelve feet, containing two beds each; two single bed-rooms, twelve by twelve feet, containing each one bed; kitchen, dining-room (twenty by forty feet), office, and drug store.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Shasta County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
2	Debility, old age (85 years).....	2	1	Fractured spine (fell).....	1
3	Phthisis pulmonalis	3	1	Fracture clavicle, pneumonia...	1
2	Cardiac, dropsy.....	2	1	Scrofula.....	1
1	Bronchitis, chronic.....	1	1	Acute dysentery	1
Number of months reported.....		12	Discharged cured.....		72
Total on hand at commencement of year		42	Died		12
Total admitted.....		93	Remaining under treatment		55

Name and location of hospital: SHASTA COUNTY HOSPITAL, one half mile from town of Shasta, California.

Physician's name and Post Office address: J. M. BRICELAND, Shasta, California.

This hospital is located one half mile west of the town of Shasta. The following buildings are on the grounds: One building, 16x62 feet, occupied by the Steward and family; one building, 18x40 feet, six rooms and dining-room; one building, 33x30 feet, five rooms and one large room for patients; new building, 30x64 feet, three rooms for patients; building, 15x15 feet, one room for four patients; building, 20x16 feet, one room and office; building, 12x12 feet, one room for three patients; store-room, 12x12 feet. Sewerage, ventilation, and water supply are very good. There is one medical attendant. A bath house, 12x16 feet, is being erected, and water will be piped from springs.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Mariposa County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
---	Heart disease	1	----	Old age and general anæmia....	1
---	Consumption	2	----	Cirrhosis of liver	2
---	Dysentery	2			
Number of months reported.....		12	Discharged cured.....		12
Total on hand at commencement of year		25	Died		8
Total admitted.....		22	Percentage of deaths, about.....		16
			Remaining under treatment		27

Name and location of hospital: MARIPOSA COUNTY HOSPITAL, Mariposa, California.

Physician's name and Post Office address: H. C. REID, Mariposa, California.

Mariposa County Hospital is located in Mariposa town, the site being the side of a mountain, a very healthy and pleasant location.

Water supply: A large spring higher up the mountain, and piped to large tank on hospital lot.

Smallest space occupied by any one inmate is six by eight feet, most of them having considerably more. Ventilation perfect.

Condition of inmates good, considering the average age, being about seventy years.

Physician employed for year by the county.

C. G. LIND.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the San Joaquin County Hospital and Almshouse, for the year ending December 31, 1889.

Total by each Disease.	DISEASES.	No. Deaths by each Disease.	Total by each Disease.	DISEASES.	No. Deaths by each Disease.
50	Rheumatism		5	Lumbago	
37	Fevers	1	2	Pleurisy	
54	General debility and old age	4	6	Hemorrhage	1
4	Blind		2	Poison oak	
2	Partially blind		1	Hydrocele	
12	Dementia		2	Shaking palsy	
1	Idiot		3	Pneumonia	1
1	Felon		4	Broken leg	
6	Wounded		2	Bubo	
18	Varicose ulcers		2	Knife wound	
2	Burnt		3	Epilepsy	
24	Paralysis	5	2	Jaundice	
35	Alcoholism	1	4	Cut foot	
18	Cripple		1	Carbuncle	
6	Asthma		1	Varioloid	
4	Broken clavicle		2	Dislocation	
14	Destitute		2	Eczema	
6	Abscess		4	Cramps	
38	Injured: hand, feet, side, face, etc.		4	Bronchitis	
7	Hemorrhoid		1	Dyspepsia	
9	Syphilis, secondary		1	Suppressed menses	
11	Syphilis		2	Cancer of stomach	1
3	Erysipelas	1	4	Hypertrophy of liver	2
5	Cystitis	1	3	Neuralgia	
1	Catarrh of bladder		1	Broken rib	
3	Morphine habit		3	Gastritis	2
9	Valvular disease of heart	1	2	Incised wound of chin	
10	Sprain		3	Stricture of urethra	
3	Enteritis	1	1	Fracture of arm, and fever	
5	Dropsy	3	1	Cataract of both eyes	
4	Vertigo		1	Chorea	
4	Granulated eyelids		1	Lead poison	
35	Phthisis pulmonalis	5	2	Pyæmia	2
1	Fever sore		2	Aneurism of aorta	1
5	Gonorrhœa		1	Catarrh of head	
1	Sarcoma of jaw		2	Cerebro-spinal meningitis	2
1	Orchitis		1	Necrosis of knee	
1	Fistula		1	Necrosis of finger	
1	Pregnancy		2	Prolapsus of arm	
1	Hernia		1	Apoplexy	1

Number of months reported	12	Discharged	363
Total on hand at commencement of year	144	Died	36
Total admitted	393	Percentage of deaths	06.7
Discharged cured	230	Remaining under treatment	138

Name and location of hospital: COUNTY HOSPITAL AND ALMSHOUSE, Stockton, California.

Physician's name and Post Office address: WM. E. GIBBONS, Stockton, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Inyo County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
3	Rheumatism	-----	3	Consumption	2
2	Colds	-----	1	Non compos mentis	-----
2	Kidneys	-----	4	Leadcd	4
3	Heart disease	-----			

Number of months reported	3	Discharged cured	8
Total on hand at commencement of year	3	Discharged	8
Total admitted	18	Died	6
		Remaining under treatment	3

Name and location of hospital: INDEPENDENCE, Inyo County, California.*Physician's name and Post Office address:* IRVING J. WOODEN, Independence, California.

The hospital is well ventilated. Pure water is brought from the mountains. The place is well supplied with everything that is needed. Medical attendance is first class in every respect. The area of the hospital grounds is about four acres. The wards are large and well ventilated.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Stanislaus County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
7	Typhoid fever	-----	5	Syphilis	-----
8	Malarial fever	-----	2	Measles	-----
6	Fractures of bones	-----	2	Stricture of urethra	-----
8	Contused wounds	-----	1	Chronic cystitis	1
2	Incised wounds	-----	3	Phthisis	1
2	Diseases of eye	-----	1	Bright's disease of kidneys	-----
1	Tonsilitis	-----	5	General debility	-----
1	Pyæmia	-----	1	Scrofula	-----
1	Mania	-----	1	Concussion of brain	-----
12	Superannuated	2	1	Concussion and contusion spine	-----
4	Paralysis	-----	3	Pneumonia	1
1	Spinal sclerosis	-----	1	Gastric catarrh	-----
1	Hydrops articuli	-----	1	Delirium tremens	-----
5	Chronic rheumatism	-----	1	Cancer of intestines	1
6	Heart disease	3	1	Hemorrhoids	-----
1	Strangulated hernia	-----	1	Dry gangrene	-----

Number of months reported	11½	Discharged	12
Total on hand at commencement of year	19	Died	9
Total admitted	87	Percentage of deaths	8½
Discharged cured	62	Remaining under treatment	23

Name and location of hospital: STANISLAUS COUNTY HOSPITAL, Modesto, California.*Physician's name and Post Office address:* C. W. EVANS, M.D., Modesto, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Barbara County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
1	Chronic alcoholism	-----	3	Locomotor ataxia.....	1
1	Dementia	-----	1	Injury to head	-----
2	Intermittent fever	-----	1	Injury to back	-----
5	Phthisis pulmonalis	3	1	Injury to leg.....	-----
5	Chronic rheumatism.....	-----	2	Ophthalmia.....	-----
3	Acute rheumatism.....	-----	1	Chronic bronchitis	-----
5	Syphilis.....	-----	1	Cirrhosis of liver.....	1
1	Gonorrhœa.....	-----	2	Heart disease	1
1	Chronic ulcer	-----	1	Poison oak.....	-----
1	Hemorrhoids	-----	1	Chronic abscess	-----
2	Paralysis.....	1	1	Neuralgia	-----

Number of months reported.....	12	Discharged.....	19
Total on hand at commencement of year	20	Died	7
Total admitted.....	44	Percentage of deaths	13 $\frac{1}{2}$
Discharged cured	21	Remaining under treatment.....	18

Name and location of hospital: SANTA BARBARA COUNTY HOSPITAL AND POOR FARM, Santa Barbara, California.

Physician's name and Post Office address: C. S. STODDARD, Santa Barbara, California.

Condition of sewerage, ventilation, and supplies, good. Medical attendance excellent. Surface area to each patient, sixty feet. Occupied twelve months. Water supply first class.

J. D. AXTELL.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Alameda County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
4	Abscesses	---	61	Indigents not sick	---
15	Adynamia	---	3	Insane	---
27	Alcoholism	4	4	La grippe	---
3	Amputations, finger	---	4	Loss of sight	---
3	Amputations, arm	---	1	Loss of hearing	---
4	Amputations, leg	---	19	Malaria	---
7	Anasarca	5	1	Melancholia	---
11	Asthma	---	1	Nephritis, acute	---
2	Bright's disease	2	3	Nephritis, chronic	---
5	Births	1	1	Neurasthenia	2
12	Bronchitis, chronic	---	2	Neuralgia	---
1	Bronchitis, capillary	1	2	Opium habit	---
30	Bruises, sprains, and other minor injuries	---	5	Orchitis	---
4	Cancer	2	1	Painters' colic	---
1	Carbuncle	---	23	Paralysis	2
1	Cerebritis	---	2	Paronychia	---
5	Cripples	---	32	Phthisis pulmonalis	18
5	Dementia	---	5	Pneumonia	1
4	Diarrhœa, acute	---	1	Prolapsus ani	---
8	Diseases of the eye	---	1	Ptyalism	---
5	Dislocations, shoulder	---	5	Rheumatism, acute	---
4	Dyspepsia	---	50	Rheumatism, chronic	---
5	Enciente	---	1	Shock	1
4	Epilepsy	---	12	Syphilis, primary	---
3	Erysipelas	---	11	Syphilis, secondary	---
1	Fistula, vesico rectal	---	4	Syphilis, tertiary	---
10	Fractures, upper extremities	---	1	Tania	---
12	Fractures, lower extremities	---	16	Ulcers of leg	---
7	Fever, typhoid	---	7	Urethral strictures	---
2	Gangrene	2	7	Uterine diseases	---
1	Gastro enteritis	1	1	Variola	---
2	Gonorrhœa	---	2	Wounds, gunshot	---
12	Heart disease	4	1	Fracture of spine	1
Number of months reported		12	Discharged		402
Total on hand at commencement of year		181	Died		47
Total admitted		507	Percentage of deaths		6 $\frac{1}{2}$
			Remaining under treatment		239

Name and location of hospital: ALAMEDA COUNTY INFIRMARY, three miles northeast of San Leandro, Alameda County, California.

Physician's name and Post Office address: A. SHIRK, San Leandro, Alameda County, California.

Our general condition is good; location, sewerage, ventilation, and supplies, all good. Water supply, very good and abundant, from springs on the premises. Farm of one hundred and twenty-three acres.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Sierra County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
1	Hemiplegia, left side.....		2	Wounds of scalp.....	
1	Interstitial absorption of the head of the femur.....	1	1	Neuralgia of bowels.....	
9	Old age.....	3	3	Disease of heart.....	2
2	Insanity.....		1	Amputation of femur.....	
1	Bronchitis.....		3	Alcoholism, acute.....	
1	Clubfoot.....		2	Frozen feet.....	
1	Lightning pains.....		1	Wound of hand.....	
1	Chronic cystitis.....		1	Dislocation of humerus.....	
1	Asthma.....		1	Paralysis agitan.....	
1	Cataract.....		2	Venereal.....	1
1	Atrophy rectus femoris.....		1	Traumatic cataract.....	
2	Consumption.....		1	Carbuncle on neck.....	
3	Sciatica.....		1	Diarrhoea.....	
			1	Injured by fall.....	
Number of months reported.....			12	Discharged.....	22
Total on hand at commencement of year.....			20	Died.....	7
Total admitted.....			26	Percentage of deaths.....	15.2
Discharged cured.....			11	Remaining under treatment.....	18

Name and location of hospital: SIERRA COUNTY HOSPITAL, Downieville, California.*Physician's name and Post Office address:* ALEMBY JUMP, Downieville, California.

Located on bank of North Fork of Yuba River, on a flat which was formerly mined by sluicing. Sewerage perfect; ventilation through windows. Supplies purchased by Board of Supervisors. Dr. Alembly Jump visits daily at 9 o'clock A. M.; salary, \$800. Surface area, fifty-eight square feet to each patient. Site occupied eleven years. Water supply from river, through flume and iron pipes.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

*Treated in the Lassen County Hospital, for the year ending December 31, 1889.**Name and location of hospital:* LASSEN COUNTY HOSPITAL, Susanville, California.*Physician's name and Post Office address:* DR. MILLIKIN, Susanville, California.

It is a difficult matter to answer your questions, as this is a poorly run hospital. There have never been any records, and there are none yet. The county has never furnished a register. Of course, I have all the names that have been in since I took it, but I do that in order to get my pay. I am paid \$5 a week for board and washing of each patient, and I pay \$10 a month for the house, so you can judge what kind of a hospital it is. As for ventilation, that is through holes in the roof. Sewage is run into Susan River. We have our bath tubs in the Susan River.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Humboldt County Hospital, for the year ending July 31, 1890.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
8	Acute rheumatism.....	---	4	General debility.....	---
1	Fistula in ano.....	---	1	Fracture of spine.....	---
1	Acute nephritis.....	---	2	Abscess in legs.....	---
4	La grippe.....	---	1	Convulsions.....	---
2	Gastric catarrh.....	---	1	Nosebleed.....	---
1	Softening of brain.....	---	1	Loss of leg.....	---
1	Paralysis.....	1	1	Acute iritis.....	---
2	Fracture of leg.....	---	1	Acute conjunctivitis.....	---
4	Acute bronchitis.....	---	1	Abscess in back.....	---
12	Chronic bronchitis.....	2	4	Alcoholism.....	---
2	Acute pneumonia.....	1	1	Bubo.....	---
2	Cataract.....	---	2	Childbirth.....	---
2	Gunshot.....	---	4	Consumption.....	3
1	Stabbed.....	---	1	Chronic cystitis.....	1

Number of months reported.....	12	Discharged cured.....	31
Total on hand at commencement of year.....	23	Discharged.....	9
Total admitted.....	57	Died.....	8
		Percentage of deaths.....	10½

Name and location of hospital: COUNTY HOSPITAL, Corner of Trinity and J Streets, Eureka, California.

Physician's name and Post Office address: S. B. FOSTER, Eureka, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Plumas County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
9	Chronic rheumatism.....	---	2	Fractures.....	---
1	Paralysis.....	1	2	Bronchitis.....	---
1	Chronic syphilis.....	---	2	Varicose veins.....	---
1	Cancer.....	1	1	Consumption.....	---
1	Gunshot wounds.....	1	8	General debility, old and worn-out persons.....	4
1	Dropsy, valvular disease of heart.....	1			
1	Prostatitis.....	---			

Number of months reported.....	12	Discharged cured.....	12
Total on hand at commencement of year.....	10	Discharged.....	3
Total admitted.....	20	Died.....	8
		Remaining under treatment.....	11

Name and location of hospital: PLUMAS COUNTY HOSPITAL, Quincy, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Fresno County Hospital, for the year ending December 31, 1889.

Total by each Disease.	DISEASES.	No. Deaths by each Disease.	Total by each Disease.	DISEASES.	No. Deaths by each Disease.
50	Fever, intermittent	---	53	Injuries	2
12	Fever, remittent	1	2	Cancer	2
8	Fever, continued	4	9	Alcoholism, chronic	1
2	Fever, typhoid	1	5	Asthma	1
12	Phthisis pulmonalis	3	3	Bright's disease	2
15	Bronchitis	1	3	Nasal catarrh	---
2	Pleurisy, chronic	1	3	Fistula in ano	---
30	Rheumatism	2	3	Nephritis	---
11	Pneumonia	1	2	Hernia	---
3	Neuralgia	---	2	Hydropericarditis	1
2	Blind	---	1	Scurvy	---
19	Paralysis	1	6	General debility	---
2	Diarrhœa	1	1	Diphtheria	---
25	Syphilis	2	3	Measles	---
26	Gastric fever	2	4	Eczema	---
3	Eye disease	---	5	Uterine diseases	---
5	Epilepsy	---	1	Hydrocele	---
Number of months reported		12	Discharged		34
Total on hand at commencement of year		54	Died		29
Total admitted		279	Percentage of deaths		87
Discharged cured		185	Remaining under treatment		85

Name and location of hospital: FRESNO COUNTY HOSPITAL, Fresno, Fresno County, Cal.
Physician's name and Post Office address: LEWIS LEACH, M.D., Fresno, Cal.

This institution is located on a lot containing eighty acres, one mile east of the city limits of Fresno. It was erected in 1889, at a cost of \$45,000, and consists of four buildings, connected by verandas, on the plan of the Sacramento County Hospital.

Buildings.—The main or central building: The offices, dispensary, parlor, and Steward's room on first floor; four rooms on second floor, and five rooms on third floor, and is supplied with water, bath-room, closets, and fireplaces. The other three buildings contain six wards, 24x60x18; dining-room, kitchen, and store-rooms. Each ward contains eighteen beds, and the walls are hard finished and heated with wood stoves. Each ward has eight windows on a side, together with bath-room, ante-room, closets, and nurse-room—twenty windows in all, and protected by inside shutters and wire screens.

Water.—The water is supplied from a well one hundred and thirty-five feet deep, by a steam pump, into three 10,000-gallon tanks, one above the other, in a tank house one hundred and five feet high. The bottom of the upper or fire tank is ninety feet from the ground. Five faucets are in each ward and dining-room, both outside and inside.

Sewerage.—Connected with a large cesspool, is a vitrified pipe, which conveys the sewage to a system of cesspools located about seven hundred yards from the buildings; a pipe is also laid for the purpose of flushing when necessary.

Supplies.—Are furnished by yearly contract, except medicines, which are ordered when required by the County Physician.

Medical Attendance.—The hospital is visited daily, or oftener if necessary, by the County Physician. There are employed, a hospital steward, three nurses, cooks, and others, to the number of nine, all told.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the San Benito County Hospital, for the year ending August 1, 1890.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
6	Various accidents	-----	2	General debility	-----
4	Bronchitis	-----	3	Remittent fever	-----
1	Ulcer, chronic	-----	1	Cataract	-----
2	Cystitis	-----	1	Partial dementia	-----
2	Phthisis pulmonalis	2			

Number of months reported	12	Discharged	16
Total on hand at commencement of year	4	Died	2
Total admitted	22	Percentage of deaths	6
Discharged cured	16	Remaining under treatment	4

Name and location of hospital: SAN BENITO COUNTY HOSPITAL, Hollister, California.*Physician's name and Post Office address:* J. H. TEBBETTS, Hollister, California.

By contract with Board of Supervisors all indigent sick, also broken down and enfeebled persons, are placed in care of County Physician. They are comfortably lodged and boarded by a Matron, at \$4 per week for each individual.

The County Physician, when necessary, employs nurses for any patient requiring extra attention. He also buys clothing for the patients. All medicines are supplied by a druggist in town, of good quality, as ordered by Physician, at a specified price, by contract.

The hospital is located on the principal business street of Hollister. The patients are required to remain on the premises. For the past two years frequent inspections by Board of Supervisors have been made, and everything found in a neat and healthy condition. No complaints have been made to me by any patient for over one year as regards food, clothing, or lack of care.

Salary of County Physician is low—only \$25, with no prospect of anything better, so far as one can judge.

The total expenses of the hospital and care of patients will average about \$115 or \$120 per month. This includes all expenses.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Merced County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
6	Diarrhoea and dysentery	-----	8	Rheumatism	-----
3	Erysipelas	-----	2	Tonsilitis	-----
16	Typhoid fever	-----	2	Peritonitis	-----
12	Malarial fever	-----	3	Scirrhus	1
7	Phthisis	3	2	Inanition	1
3	Pneumonia	-----	2	Measles	-----
2	Bronchitis	-----	8	Typho-malarial fever	-----
3	Heart disease	2	29	Indigent	-----
5	Alcoholism	1	38	Other causes	2

Number of months reported	12	Discharged	31
Total on hand at commencement of year	36	Died	10
Total admitted	106	Percentage of deaths	7- $\frac{6}{14}$
Discharged cured	68	Remaining under treatment	33

Name and location of hospital: MERCED COUNTY HOSPITAL, one half mile south of Merced City.

Physicians' names and Post Office address: DR. E. S. O'BRIEN, DR. G. P. LEE, Merced City, California.

The condition of our hospital is good, having been thoroughly repaired the past year. The location is one half mile south of Merced City. The sewerage is not as good as could be wished for, as the ground is flat, so we have to drain into cesspools. Ventilation is very good. Supplies all that can be desired. Medical attendance daily. Surface area to each patient, eight feet square, when the hospital is full; when not full, of course they have more room. The main building has been occupied as a hospital some fifteen years, the new part six years; but the whole building last year had a thorough renovation. Water supply good.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Clara County Hospital, for the year ending December 31, 1889.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
65	Phthisis	24	2	Varioloid	
15	Paralysis	6	4	Influenza	
36	Infirm		1	Fever, intermittent	
10	Imbecile		3	Insane	
7	Asthma		1	Chorea (Saint Vitus' dance)	
1	Blind		4	Wounds, knife	
36	Rheumatism		1	Sciatica	
5	Heart disease	4	9	Dropsy	
25	Ulcerations, chronic		3	Granulated eye	
7	Dislocations		2	Lumbago	
1	Cataract, eye		1	Tumor	
1	Ophthalmia		1	Burns	
5	Cystitis, chronic		23	Fever, malarial	
1	Varices		9	Diarrhoea, chronic	1
11	Bronchitis		2	Scrofula	
15	Sprains		2	Felon	
3	Enciente		3	Constipation	
14	Fever, typhoid	3	1	Fistula	
2	Erysipelas		6	Catarrh	
10	Abscess		1	Neuralgia	
11	Contusions		2	Hernia, rupture	
14	Gonorrhoea		1	Colic, lead	
18	Syphilis		2	Cancer	
4	Epilepsy		1	Pneumonia	1
19	Alcoholism	4	1	Inflammation of brain	1
4	Kidney disease			Syphilitic carbuncle	1
2	Fever and ague			Convulsions	1
3	Amputation	2		Suicide	1
7	Wounds, gunshot	1		Dislocated vertebra	1
7	Fractures			Cirrhosis of liver	1
12	Poison oak			Fracture of back	1
1	Poison wounds			Empyema	1

Number of months reported	12	Discharged	168
Total on hand at commencement of year	91	Died	54
Total admitted	364	Percentage of deaths	8.31
Discharged cured	154	Remaining under treatment	80

Name and location of hospital: SANTA CLARA COUNTY HOSPITAL, San José, California.

Physician's name and Post Office address: WILLIAM H. HAMMOND, San José, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Sonoma County Hospital, for the year ending December 31, 1889.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
8	Fracture	---	2	Enciente	---
4	Imbeciles	---	2	Dislocated wrist	---
9	Syphilis	---	1	Dislocated ankle	---
14	Rheumatism	---	2	Dislocated shoulder	---
1	Resection of elbow joint	1	1	Hemorrhage of lungs	1
2	Traumatic pleurisy	1	1	Hemorrhage of kidneys	---
17	Fever	---	3	Asthma	---
4	Fever, typhoid	2	6	Chronic alcoholism	---
3	Fever, malarial	---	5	Cancer	---
15	Wounds	---	1	Chorea	---
7	Dyspepsia	---	3	Phthisis pulmonalis	---
2	Gastritis	---	3	Hysteria	---
5	Eczema of leg	1	2	Poison oak	---
9	Heart disease	1	1	Sprained ankle	---
1	Indigestion	---	1	Tonsilitis	---
8	Bronchitis	1	1	Hypochondriac	1
4	Pneumonia	2	3	Cystitis	1
2	Chronic inflammation of liver	2	2	Gonorrhœa	---
2	Diabetes mellitus	1	2	Locomotor ataxia	---
1	Albuminuria	---	1	Hernia	1
14	General debility	3	1	Metritis	---
3	Abscess	---	8	Chronic ulcer of leg	---
1	Sciatica	---	2	Dropsy	1
2	Chronic diarrhœa	1	1	Synovitis	---
1	Scurvy	---	1	Morphine habit	---
2	Iritis	---	3	Burn	---
3	Erysipelas	---	1	Aphonia	---
3	Internal injuries	2	1	Epilepsy	---

Number of months reported	12	Discharged	51
Total on hand at commencement of year	36	Died	23
Total admitted	172	Percentage of deaths	129
Discharged cured	96	Remaining under treatment	38

Name and location of hospital: SONOMA COUNTY HOSPITAL, near Santa Rosa, California.
Physician's name and Post Office address: M. M. SHEARER, Santa Rosa, California.

Condition, just refitted, hence excellent. Location, two and one half miles from city limits, at foot of mountains; exceptionally healthy. Sewerage bad; open cesspool three hundred yards from building. Ventilation wretched. House planned and built with an inclosed court on three sides; open slat ventilators on floors, none above. Supplies ample and first class. Medical attendance: one physician in attendance daily; one Steward, one Matron, and one nurse. Surface area, etc., eight by six feet. Water supply, by windmill and horse-power; insufficient, and not very good.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Cruz County Hospital, for the year ending December 31, 1889.

Total by each Disease.	DISEASES.	No. Deaths by each Disease.	Total by each Disease.	DISEASES.	No. Deaths by each Disease.
1	Intra capsular fracture of femur.	1	1	Ulcer right arm	
2	Extra capsular fracture of femur.		1	Insanity	
2	Paralysis		1	Orchitis	
10	Indigent		2	Poison oak	
1	Traumatic erysipelas		2	Acute bronchitis	
4	Inflammatory rheumatism		1	Asthmatic bronchitis	
2	Muscular rheumatism		4	Alcoholism	1
1	Sciatic rheumatism		6	Typhoid fever	
1	Gonorrhoeal rheumatism		1	Dysentery	
1	Fracture of fibula		1	Dyspepsia	
1	Amputation of fingers		2	Syphilis	
1	Carbuncle	1	1	Fracture of femur	
1	Palmar ulcers		1	Fracture of tibia fibula	
3	Varicose ulcers		1	Compound fracture of tibia	
2	Heart disease	1	2	Sprained knee	
1	Cut foot		1	Contused chest	
1	Punctured wound, thorax		1	Dislocated spine	
1	Blindness		1	Sprained back	
1	Apoplexy	1	1	Contused nose	
1	General paresis	1	1	Abscess of abdomen	
1	Fractured rib		1	Sprained ankle	
1	Fractured clavicle		1	Tuberculosis	
1	Iritis		1	Incised wound in leg	
5	Pulmonary consumption	3	17	Old age	
1	Incised wound, ear		1	Hemorrhoids	
Number of months reported		12	Discharged		62
Total on hand at commencement of year		25	Died		9
Total admitted		76	Percentage of deaths		11 $\frac{2}{3}$
Discharged cured		45	Remaining under treatment		30

Name and location of hospital: SANTA CRUZ COUNTY HOSPITAL, Santa Cruz, California.
Physician's name and Post Office address: F. E. MORGAN, Santa Cruz, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Solano County Hospital, for the year ending December 31, 1889.

Total by each Disease.	DISEASES.	No. Deaths by each Disease.	Total by each Disease.	DISEASES.	No. Deaths by each Disease.
5	Paralysis	1	2	Alcoholism	
5	Ulcer, chronic, leg		3	Phthisis pulmonalis	1
3	Rheumatism		1	Cystitis	
1	Balanitis		2	Spermatorrhœa	
6	Fever, remittent		1	Mitral insufficiency	
4	Fever, intermittent		1	Excision inferior maxillary ne- crosis, following from gun- shot wound	
1	Fever, typhoid				
1	Parophthalmitis		2	Fracture skull, trepanning	1
1	Phlegmon		1	Fracture, tibia	
1	Fever, continued		1	Fracture, clavicle	
3	Syphilis, secondary		1	Fracture, fibula	
1	Syphilis, tertiary				
1	Stricture, urethral				

Number of months reported	12	Discharged cured	47
Total on hand at commencement of year	22	Discharged	49
Total admitted	56	Died	3
		Remaining under treatment	26

Name and location of hospital: SOLANO COUNTY HOSPITAL, Suisun, Solano County, Cal.
Physician's name and Post Office address: W. G. DOWNING, Suisun, Cal.

REPORT OF THE STATE ANALYST.

The office of State Analyst was created by the Legislature of 1885, and was approved March fifth of that year by Governor Stoneman. The State Medical Society, at its annual meeting April 17, 1884, had passed the following resolution:

Resolved, That the Legislature be recommended to create the office of State Chemist, * * * who shall act in conjunction with the State Board of Health, and whose duty it shall be to analyze food, drugs, remedies, waters, etc., and report upon the same for the general good of the people, and to the discomfiture of parties dealing in adulterated and spurious articles of food and medicine.

This action of the State Medical Society was warmly seconded by the State Board of Health, and its recommendations embodied in the Act creating the office of State Analyst. It should be said that the President, Secretary, and members of the State Board of Health have at all times done everything in their power to foster this office, and earnestly and heartily commend it to the liberal support of the people of the State of California.

The intent of the State Medical Society, which initiated this movement, of the State Board of Health which indorsed it, and of the Legislature which adopted it, was to protect and care for the people at large in matters where they could not protect themselves. In so doing California has only followed the lead of the older States in this country. Surely no more conservative field of legislation can be found.

A careful study of the organic act will disclose a twofold object:

First—Sanitary, *i. e.*, to provide for an official examination of foods, drinking water, drugs, medicines, wines, etc.

Second—To aid in the development of home resources. Under this head is included the provision for the analysis of mineral waters, wines, and all the products connected with the wine industry.

The importance of this work is apparent to every one. That the food buyer should receive the article he asks for and pays for is the first principle of commercial honesty; that the food, drugs, medicines, etc., should be pure is absolutely necessary to health, and the treatment of disease. I do not think that any discussion of this proposition is necessary; the only point upon which discussion may arise relates to the ways and means of carrying it into effect. Here again, it seems to me, the method is simple. Two things are necessary: first, the procuring of the samples; and second, they must be analyzed.

These samples may be presented by individuals, consumers who are in doubt or suspicious of the purity of the food article which they consume. Dealers who wish to buy and sell approved articles only, will present samples for examination from time to time. Experience has shown that where this examination of foods has been thoroughly carried out, the dealers are the first to present their samples for approval before purchasing. They regard the analyzing chemist as their friend, and seek his advice and opinion. The Inspectors of the local Boards of

Health are a body who can furnish samples, and the great majority, too, for analysis. It will be seen that no new legal machinery is necessary to begin and carry forward this important work.

The other side of the question, relating to the analysis of samples, is also simple. The State Analyst, when provided with suitable assistants, can make all the analyses required. With a moderate appropriation for chemical work the whole scheme of supervision of food, drugs, and medicines can be maintained.

The examination of the drinking waters of the State is one of the most important problems with which the State has to contend. As the State becomes more populous the more imperative will it become. Three years ago the State of Massachusetts appropriated thirty thousand dollars (\$30,000) for this work, and has appropriated twenty-five thousand (\$25,000) yearly ever since. The first report will be given to the public this year, and it is not too much to say that it will in all probability be a most valuable contribution on the subject of water supply for cities and towns. In a supplement to this report I shall take up this question in detail, and will present some of the conclusions reached by the Massachusetts investigation. So much, however, I can state, that they have found it necessary to investigate the waters of each section and determine their constitution. The waters of the State may be classified into districts, and each has its own peculiarities and composition.

The water problem with us is peculiar, and differs from that of any other State, and must be settled by thorough and independent investigation. It has been a matter of great regret to the State Analyst that he has not been able to do more work upon this problem. Many samples of water have been submitted for analysis during the last two years, which could not be examined because there was no one to do the work.

The analysis of the mineral waters of the State is of the highest importance, both from a health and political standpoint. California has more mineral springs than any other State in the Union, and, presumably, better ones; yet, from lack of proper analysis and investigation, they are not appreciated and patronized as they deserve. Every year large numbers of our own citizens, as well as those from neighboring States, visit the mineral springs of Europe, at great expense to themselves and loss of patronage to us. I know of no direction in this State in which a small expenditure of money would bring so large a return in the form of permanent development. The mineral springs would supplement the known attractions of climate, and many thousand visitors would yearly come to our coast if they could but know the value of our mineral waters. A report printed under the auspices of the Board of Health, giving the analysis of our springs, would do much to attract visitors and immigrants.

The materials for a full report are not available at this time, and I shall present them in the form of a supplement to be published at an early date. In this supplement I shall present a statement of the work that I have done, and discuss some of the problems which belong to the office of State Analyst.

In this conclusion I will say that the University has just built a new laboratory for the department, in which suitable working-rooms are provided for the State Analyst. It is very doubtful if better accommodation for carrying on investigations in this department can be found anywhere.

They have been planned with care, and provision has been made for the service of the State in this direction. I have had the opportunity of visiting the more important laboratories of this country and Europe the past summer, and have used the occasion to study the methods of analysis and investigations as applied to foods, etc. I trust that such provision may be made for the support of this office as will enable it to do the work for which it was created.

Respectfully submitted.

W. B. RISING,
State Analyst.

BERKELEY, November 1, 1890.

MONTHLY REVIEW OF DEATHS AND PREVAILING DISEASES

REPORTED TO THE STATE BOARD OF HEALTH FROM JUNE 30, 1888,
TO JUNE 30, 1890.

[Reprinted from Monthly Circular of State Board of Health.]

JULY, 1888.

Mortality reports received from eighty-five cities and towns within the State return the number of deaths as nine hundred and fifty-eight in an estimated population of seven hundred and seven thousand eight hundred and fifty, a monthly percentage of 1.34 per thousand, or an annual death rate of 16.08, which indicates that the low mortality noticed in last report still continues.

CONSUMPTION, which, as before remarked, adds largely to our monthly mortality, gives the remarkably small number of one hundred and thirty-seven deaths in July, a decrease of nineteen from last report, which was then the smallest recorded in several months.

PNEUMONIA caused forty-six deaths, thirty-nine occurring in San Francisco, the remaining seven being distributed throughout the State, which is a great decrease in the mortality from this disease, and indicates a general absence of acute pulmonary diseases.

BRONCHITIS caused but sixteen deaths throughout the State, San Francisco, Oakland, and Los Angeles contributing them all.

CONGESTION OF THE LUNGS was fatal in seven instances among children.

WHOOING-COUGH is credited with thirteen deaths, eleven of which occurred in San Francisco and two inland.

DIPHTHERIA continues to add to our mortality, twenty-eight deaths being attributed to it and nine to croup, which makes a record of thirty-seven deaths from these twin diseases. San Francisco reported eleven, Oakland eleven, San Bernardino three, Sonora two; College City, Etna Mills, Truckee, Vallejo, Napa, Los Angeles, Mono, Watsonville, San José, and Stockton one each.

SCARLET FEVER caused seven deaths, one in Sacramento, one in Elk Grove, one in Grass Valley, one in Wheatland, and three in San Francisco.

MEASLES had the small mortality of two.

SMALLPOX caused two deaths, both in San Francisco; recent arrivals there.

TYPHOID FEVER is credited with thirty-five deaths; same mortality as occurred in June.

REMITTENT FEVER was fatal in ten instances.

CEREBRO-SPINAL FEVER caused twelve deaths, which is double the number recorded in June.

CANCER was fatal to forty-three decedents, which is a large increase for the month.

HEART DISEASE also carried off the large number of seventy-two.

ERYSIPELAS was fatal in two instances.

ALCOHOLISM caused six deaths.

The following towns report *no deaths* during the month of July: Biggs, Bodie, Castroville, Cedarville, Dixon, Downieville, Downey, Fort Bidwell, Gonzales, Igo, Knights Ferry, Lincoln, Livermore, Merced, and Roseville.

PREVAILING DISEASES.

Reports received from eighty-five localities indicate a limited amount of sickness throughout the State, the most prevalent being disorders of the alimentary canal and paludal fevers. There seems to be an increasing prevalence of typhoid fever, which can in almost every instance be traced to impurity in the water consumed. This may be expected until the rainy season sets in, when the ground water will rise and correct the impurities which probably exist in all shallow wells that receive the surface drainage.

CHOLERA INFANTUM prevails quite generally, and is noticed in reports from Santa Ana, Lodi, Healdsburg, Dixon, College City, Fort Bidwell, Lakeport, Shasta, Williams, Sisson, Lemoore, Cottonwood, San Francisco, Oakland, Healdsburg, Truckee, and Stockton. If it is true, as recorded by Hayem, that cholera infantum depends upon the development of a microbe in the bowels, mothers cannot be too careful in seeing that the milk fed to babies during the summer months is first boiled, and never given when *sour or musty*, but freshly prepared for each meal. Hundreds of lives are sacrificed yearly by neglect of this precaution. The boiling of the milk from cows fed upon alfalfa is particularly requisite, as this kind of feeding seems to give an irritating quality to the milk, which in most babies induces a very violent diarrhoea and disturbance of the stomach.

DIARRHŒA is mentioned as prevailing to a noticeable degree in Mariposa, Sierra City, Dixon, College City, Cedarville, Alturas, Fort Bidwell, Colton, Lakeport, Bakersfield, Shasta, Sisson, Downey, Santa Clara, Tulare, Livermore, Calico, Benicia, Gridley, Sacramento, and Salinas.

DYSENTERY is reported in Jolon, Tulare, Igo, Mariposa, Colton, Sisson, Santa Cruz, Truckee, Salinas, and Millville.

CHOLERA MORBUS was also noticed in College City, Lemoore, Bakersfield, Williams, Truckee, and Redwood City.

All of these diseases are more or less influenced by meteorological conditions, extreme heat being a prominent factor when associated with insanitary conditions, decomposing material, or unsuitable food.

SMALLPOX.—There was but one case of smallpox reported in July, and that came by train from Bethany, near Stockton, to San Francisco. No other cases of smallpox seem to have arisen from it. Two cases of smallpox were imported from China on the second of August, and were at once provided for by the City Board of Health of San Francisco. We may, therefore, practically claim California to be free from the disease.

MEASLES, in a mild form, was present during the month in Sonora, Sisson, Jolon, Millville, Santa Clara, Redwood City, Lodi, Biggs, Castroville, and Oakland.

SCARLET FEVER was observed in Lemoore, Biggs, St. Helena, Wheatland, Elk Grove, Sacramento, Grass Valley, and San Francisco.

DIPHTHERIA was quite prevalent in Oakland during the month, and is mentioned in reports from San Francisco, Sonora, Tulare, Truckee, Etna Mills, Riverside, College City, San Bernardino, Napa, Pomona, Stockton, and Vallejo. The contagious nature of the disease ought to insure prompt disinfection of every article used by the sick, and strict isolation should be enforced in every case. There is no doubt that diphtheria is frequently propagated by permitting mild cases of the disease to mingle with the public, it not being generally known that from the mildest attack the most virulent can be and often is developed.

WHOOPIING-COUGH was present in Gridley, Bakersfield, Biggs, Tulare, Lockeford, Calico, Bodie, and San Francisco.

ERYSIPELAS.—Sporadic cases of this disease were reported in Sacramento, Downey, Igo, Truckee, Merced, Tulare, Gridley, Sonora, Mariposa, Sierra, Fort Bidwell, Millville, Bakersfield, Williams, and St. Helena. The type was mild and not attended by any serious mortality.

TYPHOID FEVER was noted in Colton, Cloverdale, Chico, Davis, Jackson, Los Angeles, Oakland, Pasadena, Redwood, Sacramento, San Francisco, San José, San Diego, Fort Bidwell, Lakeport, Shasta, Igo, Healdsburg, Hills Ferry, Santa Clara, Merced, Etna Mills, and Salinas.

TYPHO-MALARIAL FEVER was present in Davis, College City, Elk Grove, Pomona, Millville, Truckee, Igo, Lemoore, Tulare, and Cloverdale.

REMITTENT FEVER was noticed in Dixon, College City, Sierra, Knights Ferry, Williams, Bakersfield, Downey, Ontario, Lemoore, Tulare, Bodie, Cloverdale, Cottonwood, and Wheatland.

PNEUMONIA.—Some cases of this disease were noticed during the month in Santa Clara, Downey, Brownsville, Gonzales, Lockeford, Tulare, Etna Mills, Castroville, San Diego, Salinas, San José, Marysville, Colfax, and San Francisco.

CHOLERA is prevalent in Hongkong, and has made its appearance again in Japan. The proximity of cholera through the constant commercial intercourse between these countries and our own, renders us peculiarly exposed to an invasion of the disease, recollecting the persistence with which cholera germs maintain their existence under the most adverse circumstances. With bowel disorders so prevalent as they are now, the human system is in a condition of receptivity that would readily become infected and develop the disease in its most fatal form. Sir Joseph Fayer, from his great experience in India, maintains that under certain circumstances cholera morbus, or summer cholera, may become epidemic, and is indistinguishable from Asiatic cholera, variation being in severity and not in kind. It is therefore prudent to avoid all known causes of bowel disorders, especially overripe or decayed fruit, and all noxious emanations from any source. The strictest hygienic measures should be enforced within our cities, our dwellings, and surroundings. All garbage and decaying organic matter should be burned or deeply buried, outhouses cleaned and whitewashed, as cholera, if it once invades our State, will spare none but those who have made themselves secure by sanitary forethought and precaution.

PACIFIC COAST WEATHER.

WEATHER.—Rain fell in Washington Territory on the 1st, 2d, 3d, 11th, 12th, 13th, 14th, 25th, 26th, 27th, and 28th; in Oregon on the 1st, 2d, 3d, 12th, and 13th; and local showers in California on the 11th, 12th, 17th, 18th, 19th, and 20th.

Thunder storms occurred along the California coast, north of San Francisco, on the 11th, and in the mountain districts of eastern California on the 17th, 18th, 19th, and 20th, those on the three latter days being unusually severe.

Two storms were traced during the month, passing from the coast to the east over Washington Territory and Oregon, on the 2d and 11th.

RAINFALL.—The precipitation has been about normal throughout California; elsewhere it has been about half an inch above. The heaviest rainfall reported for stations in California was 3.51 inches at Summit.

TEMPERATURE.—The mean temperature has been about normal over the entire coast. An unusually warm wave extended along the coast of California on the 15th; the maximum thermometer on that date at San Francisco reading 93.4 degrees, being the highest temperature recorded at that point since 1849. The warm wave spread over the interior valleys the following day, and extended to Oregon and Washington Territory on the 17th;

but continuing over the interior of California until the 24th, when it moderated somewhat. The highest temperature reported from stations in California was 117 degrees, at Mammoth Tank, on the 22d; the average of the observations taken daily at 2 p. m. at that station being 110.2 degrees, and the monthly mean temperature of 97.20 degrees. Maximum temperature of 100 degrees, or over, were reported from all stations in California other than those located on the immediate coast or in the mountain districts.

AUGUST, 1888.

Mortality reports received from fifty-one cities and towns, with an estimated population of seven hundred and twenty-two thousand six hundred, give the number of deaths as nine hundred and eight, which is a monthly percentage per thousand of 1.25, or an annual death rate of .15 per thousand, which is the lowest percentage we have had during the year, and indicates an absence of any serious epidemic disease.

CONSUMPTION caused one hundred and thirty-eight deaths, over one sixth of the total mortality.

PNEUMONIA was fatal in forty-three instances—thirty-two of them in San Francisco, four in Oakland, and one each in Stockton, Santa Rosa, Santa Clara, San Bernardino, Nevada City, Marysville, and Dixon.

BRONCHITIS caused fourteen deaths, thirteen of which occurred in San Francisco, and one in Trinity County.

CONGESTION OF THE LUNGS was fatal in nine instances—one in Sacramento, one in San Diego, and seven in San Francisco. From these statistics we infer that outside of San Francisco acute pulmonary disease was almost absent from the State during the month.

WHOPING-COUGH is credited with four deaths, three of which occurred in San Francisco and one in San Bernardino.

DIPHTHERIA still continues a large factor in our mortality list, no less than thirty-one deaths being caused by it during the month. If we add to this ten from croup, we have a mortality of forty-one from these allied diseases. San Francisco reports nineteen, Oakland seven, Los Angeles five, Sisson three, and one each in Watsonville, Stockton, Selma, Santa Cruz, San José, San Bernardino, and Cloverdale.

SCARLET FEVER caused two deaths—one in Sacramento and one in Lemoore.

MEASLES had no mortality during the month.

SMALLPOX caused no deaths.

TYPHOID FEVER was fatal in twenty-seven instances, which is a decrease from last report.

TYPHO-MALARIAL FEVER was fatal in six instances.

REMITTENT FEVER is credited with eighteen deaths, which is an unusual mortality from this disease.

CEREBRO-SPINAL FEVER caused six deaths.

CANCER was fatal in twenty-four instances, which is a decrease of nearly one half from last report.

CHOLERA INFANTUM was the cause of thirty deaths, which is a marked decrease from July, when the deaths from this cause were sixty.

DIARRHEA AND DYSENTERY were fatal in thirteen instances, which is also a decrease from the last report.

HEART DISEASE caused sixty-two deaths.

ERYSPELAS was fatal in four cases.

ALCOHOLISM increased its mortality from six in July to twelve in August.

The following towns report *no deaths* during the month: Alturas, Auburn, Azusa, Biggs, Bodie, Calico, Castroville, Cottonwood, Downieville, Etna Mills, Elk Grove, Forest Hill, Fort Bidwell, Gridley, Hills Ferry, Igo, Knights Ferry, Lincoln, Lakeport, Millville, Roseville, Sierra City, Shasta, and Williams.

PREVAILING DISEASES.

Reports received from seventy-five localities continue to indicate a very limited amount of sickness throughout the State, and although during some days within the month the temperature ranged as high as 111 degrees in some parts of the State, not a single case of *sunstroke* or thermic fever was reported to this office, or, as far as known, occurred within its bounds.

CHOLERA INFANTUM was noticed with some frequency in Lemoore, Dixon, Sacramento, Mariposa, Cedarville, Fort Bidwell, Sierra City, Pomona, Salinas, San Diego, Los Angeles, San Bernardino, Oakland, and San Francisco.

DIARRHEA AND DYSENTERY were observed in Millville, Lemoore, Anaheim, San Diego, Monterey, Jolon, Castroville, San Bernardino, Downey, Tulare, Fresno, Cloverdale, Knights Ferry, Cottonwood, Lincoln, Biggs, Weaverville, Anderson, Etna Mills, Sisson, Truckee, Alturas, Sierra City, Vallejo, and San Francisco.

MEASLES was noticed in Castroville and Cloverdale.

SCARLET FEVER was present in Sacramento, Lemoore, Biggs, Sisson, Oakland, and San Francisco. The type is singularly mild, and attended by a very limited mortality.

DIPHTHERIA still occupies a considerable portion of the State, and adds a large item to our death rate during August. It was noted in reports from San Francisco, Oakland, San Bernardino, Los Angeles, Santa Cruz, Selma, Watsonville, St. Helena, Anderson, Sisson, Colfax, Etna Mills, Sonoma, Gridley, and Fresno.

WHOPING-COUGH was present in Anderson, Calico, Elsinore, Livermore, San Bernardino, and San Francisco.

ERYSIPELAS, in sporadic form, was observed in Millville, Downey, Biggs, Colfax, Sierra City, Fresno, Brownsville, Oakland, and San Francisco.

TYPHOID AND TYPHO-MALARIAL FEVER is mentioned as present in Elk Grove, Sacramento, Lemoore, Hopland, Igo, Anderson, Knights Ferry, Cloverdale, Colton, San Diego, San Bernardino, Los Angeles, Pasadena, Pomona, Hills Ferry, Truckee, Fort Bidwell, Etna Mills, Tulare, Salinas, Oakland, and San Francisco. In Yuma, Arizona Territory, Dr. Taggart writes typhoid fever and diphtheria are epidemic.

REMITTENT FEVER is noticed in Bodie, Millville, Lemoore, Cottonwood, Lodi, Igo, Williams, Alturas, Knights Ferry, Downey, Sisson, Colfax, Fresno, Elsinore, Lockeford, and Shasta.

PNEUMONIA.—A limited number of cases of this disease were noticed in Downey, Salinas, San Bernardino, Dixon, Marysville, Nevada City, Oakland, Santa Clara, Santa Rosa, Stockton, and San Francisco. It is not marked "prevalent" anywhere, and was probably as limited as it will be during the year.

BRONCHITIS has almost disappeared from our sickness reports, although a case or two was noticed in Bodie, Weaverville, Mariposa, Fresno, and San Bernardino. It was more frequent in San Francisco than anywhere, but there the disease was limited, as a rule, to the advanced in life.

PAROTIDITIS, or MUMPS, was quite epidemic in Castroville.

SMALLPOX has, we regret to say, reappeared in San Francisco, Oakland, and Redding. In San Francisco, August twenty-third, it was introduced by a man trading on the San Joaquin River; in a few days several cases developed, and by the thirtieth of the month fourteen cases were in the hospital. Two cases were detected in Oakland, but were immediately quarantined. One case was also detected in Redding, and placed in the smallpox hospital. Owing to the exceeding mildness in the character of the disease which developed during the past winter, proper precautions were not taken in those parts of the State, outside the large cities, to properly destroy the clothing, disinfect or fumigate the premises, or render it improbable or impossible for the disease germs to exist in or about those attacked by the disease, many of the cases never going to bed, and others as equally careless of the health of their neighbors. As a result we may look for an outbreak of the disease when the winter season approaches and these diseased garments are again brought into use. What was mild in its form last winter may be most virulent in its course this winter. The wisest course to pursue, then, is to get vaccinated early, and thus anticipate disease by timely preventive measures.

PACIFIC COAST WEATHER.

The pressure was highest over Northern California on the second, and Southern California on the eighteenth. It was lowest over California on the fourteenth.

TEMPERATURE.—The temperature was slightly above the average in Northern California, and from one to two degrees below the normal in Southern California; the highest temperature reported from any Signal Service Station in the State during the month was from Fresno, where the temperature on the twenty-fourth was reported at 111 degrees.

STORMS.—No storms of violence appeared on the Pacific Coast during the month. A light rain fell in the vicinity of San Diego on the twenty-eighth. It moved northeasterly, resulting in very light showers, disappearing in Inyo County during the early morning of the thirtieth. A light shower also fell in the vicinity of Fort Bidwell on the sixteenth.

SEPTEMBER, 1888.

Mortality reports received from sixty-four cities and towns, with an estimated population of seven hundred and two thousand seven hundred, record the deaths therein at eight hundred and eighty-two, giving a monthly percentage per thousand of 1.25, or an annual death rate of 15 per thousand, which is the same as that in August, and unmistakably shows the healthy condition of the State, and how exceedingly low our death rate is compared with that of any other State in the Union. The principal causes of death were:

CONSUMPTION, which carried off one hundred and sixteen decedents, the larger number dying in San Francisco, where such cases congregate in large numbers.

PNEUMONIA was fatal in thirty-eight instances, which is a slight decrease from last report, but large enough to indicate an increase in the frequency of the disease.

BRONCHITIS caused fourteen deaths, all of which occurred in the coast counties, except one, which is credited to Oroville.

CONGESTION OF THE LUNGS was fatal in five instances.

DIARRHŒA AND DYSENTERY were fatal in fourteen cases, which shows an abatement in the prevalence of the disease.

CHOLERA INFANTUM, although abating, gives a record of thirty deaths, which is the same as recorded last month.

DIPHTHERIA was fatal in twenty instances, which is a decrease of eleven from last report. Only five deaths occurred in San Francisco from it. Five were reported from Oakland, four from Los Angeles, two from Nevada City, two from St. Helena, one from Stockton, and one from Santa Barbara.

CROUP.—Fourteen deaths are recorded from this disease—eight in San Francisco, three

in Oakland, two in Los Angeles, and one in Lincoln. In all these places diphtheria was present. The inference is therefore strong that all these cases were diphtheritic.

WHOOPIING-COUGH was fatal in six instances.

SCARLET FEVER is credited with four deaths—one in Hollister, one in San José, one in Red Bluff, and one in San Francisco. The disease is not prevalent.

MEASLES caused no deaths in this month.

SMALLPOX was fatal in two instances, both occurring in San Francisco.

TYPHOID FEVER is beginning to increase our mortality tables, forty-two deaths being recorded against it; nearly double the number of those dying in August.

TYPHO-MALARIAL FEVER has, however, only four deaths attributed to it.

REMITTENT FEVER, on the contrary, records seventeen deaths, an unusual number; not quite as many as were attributed to it last month by one.

CEREBRO-SPINAL FEVER caused seven deaths—three in San Francisco, two in Santa Rosa, one in Tulare, and one in Woodland.

ERYSIPELAS was fatal in three instances.

HEART DISEASE is credited with fifty-one deaths.

ALCOHOLISM was fatal to eight decedents.

The following towns, with an estimated population of fourteen thousand four hundred, report no deaths during the month: Anderson, Bodie, Castroville, Colfax, College City, Colton, Dixon, Elk Grove, Fort Bidwell, Lemoore, Millersville, Newman, Ontario, Sierra City, Shasta, and Wheatland.

PREVAILING DISEASES.

Reports received from eighty-five localities in different parts of the State all agree upon the extreme healthfulness of their respective districts.

CHOLERA INFANTUM was observed in several instances in San Bernardino, Sisson, Elsinore, Dixon, Sacramento, and Oakland.

DIARRHEA AND DYSENTERY are mentioned in reports from Lincoln, Elsinore, Shasta, Benicia, Weaverville, Anaheim, San Bernardino, Fresno, Sisson, Downey, Livermore, Tulare, Fort Bidwell, Sierra City, Bakersfield, Gonzales, Marysville, Sacramento, Oakland, Pomona, Vallejo, and Truckee.

SMALLPOX, during the month, numbered twenty-four cases in San Francisco. In Stockton one case was imported from San Francisco; another appeared in Livermore, one case developed in Elk Grove, and one in Sacramento City. All were strictly quarantined, and so far the disease has not spread. For reasons heretofore given, we may look for a gradual increase of the disease. Prudence should, therefore, suggest that vaccination be insisted upon throughout the State, as time can alone tell whether the disease now commencing may develop an epidemic or malignant tendency, or continue in the mild form assumed during the past winter and spring. Better far to prevent either by timely vaccination, which is safe and certain to protect those availing themselves of it.

MEASLES is mentioned as in Jolon.

SCARLET FEVER is lingering here and there throughout the State. The type is peculiarly mild, and the mortality very limited. It is noted in reports from San Francisco, Jolon, Anderson, Hollister, San José, Visalia, and Red Bluff.

DIPHTHERIA.—Nineteen cases were reported from San Francisco, where the disease is abating. In Oakland a good many cases occurred; also in Los Angeles. Sporadic cases were mentioned in St. Helena, Sonora, Sisson, Lincoln, Jolon, Etna Mills, Truckee, Nevada City, Santa Barbara, and Stockton.

WHOOPIING-COUGH is present in St. Helena, Livermore, Angels Camp, College City, Chico, Petaluma, and Bakersfield.

ERYSIPELAS was noted in Sacramento, San Bernardino, Fresno, Weaverville, Millville, Mariposa, Bakersfield, Oakland, and San José.

TYPHOID FEVER is mentioned in reports from Anaheim, Sisson, Alturas, Jolon, Newman, Livermore, Fort Bidwell, Etna Mills, Truckee, Colton, Healdsburg, Jackson, Marysville, Oakland, Pasadena, Petaluma, Sacramento, San Bernardino, San Diego, San Francisco, Santa Ana, Santa Barbara, and Stockton. At this season of the year we expect typhoid fever to prevail more or less, but so far there has been only sporadic cases, without any tendency to become epidemic.

REMITTENT FEVER seems much more prevalent than any fever except the intermittent fever, and seems to take the form called bilious. It is reported in Fresno, Oakland, Oroville, Sacramento, San Bernardino, San Diego, San Francisco, Downey, Benicia, Sisson, Knights Ferry, Cottonwood, Newman, Lakeport, Tulare, Truckee, and Bakersfield.

PNEUMONIA is again mentioned in our reports, in different places: Fresno, Livermore, Ventura, Calistoga, Anderson, Bakersfield, Oakland, San Francisco, Santa Rosa, San Diego, Oroville, Los Angeles, Healdsburg, Red Bluff, and Chico.

BRONCHITIS is also noticed in reports from San Bernardino, Fresno, Cottonwood, Hopland, Bodie, Lakeport, Lemoore, Merced, Red Bluff, Santa Rosa, Oakland, and San Francisco.

VARICELLA, OR CHICKENPOX, is prevalent in Dixon and Mariposa.

YELLOW FEVER.—The presence of this disease in Florida, and its rapid dissemination into neighboring States, has caused some uneasiness in California, lest the large immigration from the South into this State might carry some of the infective germs with it into our warm valleys, where they would have all the requisites for development into destructive activity to the ruin of our State. To guard against such a possibility, the State Board of Health have appointed Dr. S. S. Herrick, an expert in the diagnosis of yellow fever, to visit our southern frontier, and ascertain the extent of our liability to

infection either from Florida, or Mexico, and to take every means known to science to guard against the entrance of yellow fever, if such should threaten us. A great many persons, with confidence begotten of an unfamiliarity with the disease, believe that yellow fever could not exist in California, and, therefore, think we have nothing to dread from intercourse with States afflicted with the disease, or the countries where it is epidemic. Experience, however, teaches us that special sanitary precautions are requisite whenever yellow fever approaches us within five days' travel, as within that time it may get into our State before the fever is developed. Years of past immunity will not save us if once we permit the disease germs to get a lodgment in the warm valleys of our State. It is absurd to suppose that yellow fever could find no abiding place upon this coast; the same fallacy was entertained for years in Mazatlan, La Paz, Guaymas, Hermosillo, and Rosario—the latter place, three thousand feet above the level of the sea, where, until within a few years since, the fever was unknown. Yet, when through carelessness and the belief in the invulnerability of the climate to such disease it was admitted, it not only decimated the inhabitants, but is now permanently established as endemic to these places.

Yellow fever requires simply the initial germ, a temperature of 70 to 80 degrees, with a humidity of 70 to 80 degrees, to flourish. The mean temperature of Southern California is between 70 degrees and 80 degrees during the warm months. The mean humidity, say of Los Angeles, is, August 77 degrees, September 82 degrees, October 80 degrees, according to the Signal Service report of last year. The humidity of San Diego was 79, 80, and 82 degrees, for the same months. In Jackson, Florida, the mean temperature is 76 to 80 degrees, and the mean humidity is respectively 82, 82, 80 degrees; so that as far as the temperature and humidity of Jackson, Florida, and that of our southern border, there is not much to choose between them. In the Sacramento Valley the mean humidity is for the same months 58, 59, and 70 degrees; so that the greater dryness of the air would render us liable to cultivate the disease, *but the truth must be acknowledged, that we are as yet ignorant of the limits within which yellow fever can be confined.* Therefore, instead of waiting for it to enter our doors for the purpose of experimenting as to whether it can or cannot live in California, the State Board of Health concluded that the safest course for the State to pursue was to exclude it altogether, if ceaseless vigilance and unremitting attention to complete sanitation can accomplish such purpose.

PACIFIC COAST WEATHER.

The September just passed has been an unusually warm month over all the country west of the Rocky Mountains. The greatest departures from the normal temperature occurred in Idaho and Nevada, where the mean temperature for the month was nearly 15 degrees above the average mean for September. In Northern California the mean temperature was about 10 degrees above the normal in the interior and 3 degrees along the coast, and in Southern California about 5 degrees above the normal.

The rainfall for the month was light, except in the central portion of California, where heavy showers of rain, accompanied by thunder and lightning, fell on the 14th and 15th.

OCTOBER, 1888.

Reports received from seventy-nine localities return a mortality for the month of October of nine hundred and two decedents, in an estimated population of seven hundred and twenty-six thousand eight hundred and fifty, giving the remarkably small monthly percentage of 1.24 per thousand, or an annual death rate of 14.88. We believe that this is a lower percentage of deaths than will be found in any State within the Union for the month of October. The deaths for the month from infectious or zymotic diseases, including typhoid fever, did not reach one tenth of the total mortality, which shows how remarkably free the State is from any epidemic disease with a fatal tendency.

CONSUMPTION, as usual, holds the highest place in our mortality record, one hundred and forty-three deaths being attributed to it, which is an increase over the previous month.

PNEUMONIA also shows an increase, having caused forty-seven deaths in October. This may be attributed to the meteorological changes during the month, causing an increased number of persons to be attacked by the disease rather than to any malignity in its type.

BRONCHITIS was fatal to fifteen decedents.

CONGESTION OF THE LUNGS caused eight deaths.

DIARRHŒA and DYSENTERY was fatal in twenty-two instances, which is an increased mortality from this cause over that of the month previous.

CHOLERA INFANTUM records thirty deaths, which is a large mortality so late in the season. August and September had the same number of decedents from this cause.

DIPHTHERIA was fatal in twenty-six instances, an increase over last month's report. Of these, four died in Los Angeles, four in Santa Barbara, three in Oakland, five in San Francisco, two in Watsonville, and one each in Alameda, Downey, Nevada, Pasadena, Pomona, Rocklin, Sacramento, and San Bernardino.

CROUP caused fourteen deaths. As these were probably all the result of diphtheritic infection, the fatality from this preventable disease is quite a prominent feature in our death record.

WHOOPING-COUGH caused two deaths.

SCARLET FEVER is credited with three deaths—one in Marysville, one in Truckee, and one in San Francisco.

MEASLES was fatal in but one instance.

SMALLPOX caused two deaths, both in San Francisco.

TYPHO-MALARIAL FEVER is credited with six deaths.

TYPHOID FEVER had a fatality of thirty-six, which is a decrease from last report. San Francisco is credited with thirteen of these fatal cases, Los Angeles five, Sacramento four, Redding two, and one each in San Diego, Anaheim, Santa Ana, Santa Barbara, San Bernardino, Watsonville, Riverside, Placerville, Truckee, Oakland, Napa, and Chico.

REMITTENT FEVER caused six deaths—two in San Francisco, and one each in Oakland, San Diego, San Bernardino, and Santa Ana.

CEREBRO-SPINAL FEVER was fatal in eleven instances, which is an increase over the report for September. Seven of these were reported from Oakland, one from Chico, one from Igo, one from San Francisco, and one from Santa Rosa.

ERYSIPELAS caused no deaths.

HEART DISEASE caused fifty-five deaths.

CANCER was fatal in eighteen instances.

ALCOHOLISM caused nine deaths.

The following towns report no deaths during the month: Alturas, Castroville, Cedarville, Etna Mills, Lockeford, North Bloomfield, Roseville, and Forest Hill.

PREVAILING DISEASES.

Reports received from eighty-four localities are singularly united in the assertion of the reporters that there was no sickness worth speaking of in their several fields of practice, and the assertion seems founded upon fact when compared with the reports of mortality from acute disease.

CHOLERA INFANTUM was observed in many localities in sporadic form, and is mentioned in reports from Wheatland, Elsinore, Lodi, Bakersfield, Colfax, Gonzales, Nevada City, Anaheim, Los Angeles, Oakland, Pomona, Salinas, Sacramento, Santa Ana, Santa Rosa, and San Francisco. The season is late for this disease to be so prevalent, but may be owing to the increased temperature over normal that prevailed throughout the month.

DIARRHEA AND DYSENTERY seem also to have been quite marked in several localities. In Sacramento, Nicolaus, Cedarville, Brownsville, Wheatland, Merced, Lakeport, Lockeford, Tulare, Redding, Igo, Lemore, Lincoln, Williams, Red Bluff, Fresno, Downey, San Bernardino, Benicia, Newcast, Bodie, San Francisco, and other places, they have been quite noticeable from their frequency, but not from their fatality, as the type has been mild and yielded readily to appropriate remedies.

SCARLET FEVER was quite prevalent in Sacramento, San Francisco, Sisson, Colton, Lockeford, Truckee, Biggs, Anderson, Red Bluff, and Marysville. The type is particularly mild, and rarely shows malignancy. This form of the disease leads to gross carelessness upon the part of parents and guardians, in permitting their children to attend school, and in allowing the visits of other children to their houses while the disease is still there, as it is impossible to tell in what case it will take on the mild course, or in what the malignant type. Every case of scarlet fever or scarlatina should be promptly isolated, and no intercourse permitted between the sick and the well, until perfect convalescence was established, and the place of sickness thoroughly fumigated and disinfected. Scarlet fever germs are among all germs most persistent in their tenacity of life; they will live for months, perhaps years, in infected garments, and come forth at some favorable opportunity to reap a harvest of sickness, perhaps death, or, in many instances, to impress a lifelong impairment of bodily strength and vigor. The mildness of the attack is often the precursor of serious disease, and too much care cannot be taken of those affected by scarlet fever in any form, and no words can sufficiently condemn any person who permits the intermingling of the sick suffering from scarlet fever with the well, where it is within the bounds of possibility to prevent it.

MEASLES is mentioned in reports from Jolon. In other places it seems to have exhausted the susceptible material.

SMALLPOX appeared in one instance during the month in Sacramento. The man was working on a ranch some distance from the city, and knew of no means whereby he could have become infected. In San Francisco some few cases were detected in the County Hospital; one case came from Cincinnati on the train, and developed the disease on arrival in San Francisco. As we know not how soon the disease may take on an epidemic character and extensive range, the necessity of immediate vaccination cannot be too earnestly urged. Through it we can avert an epidemic, and by it can positively protect the person from attack. We would therefore urge our local Boards of Health and Health Officers to attend to the vaccination of all unprotected persons at once. A pandemic wave is slowly but surely passing over these United States, and we cannot escape it except by thorough vaccination and revaccination, when it will pass harmlessly by.

DIPHTHERIA unfortunately is a constant visitor in many towns. It is noticed in reports from Rocklin, Truckee, Redding, Biggs, Anderson, Sacramento, San Francisco, Oakland, Watsonville, St. Helena, Santa Barbara, Los Angeles, Tulare, Jolon, San Bernardino, Pasadena, Pomona, Downey, and Alameda. The cases seem sporadic, without any tendency to epidemicity. When attacking children in the form of croup, its fatality is greatest. The necessity of taking all possible sanitary measures to prevent the spread of this formidable disease is apparent, or ought to be, to everybody, and yet we witness public funerals of those dead of the disease; we see houses crowded with mourning friends where the spores of disease are floating all around them, and if they escape it is not owing to their own prudence, but to the condition of their system, which renders them anti-

pathic to the disease at that time. Until such foolish proceedings are forbidden by law, and under a penalty, we may expect diphtheria to be carried from place to place, and to take its victims wherever it can find a suitable medium for its development.

WHOOPING-COUGH is noticed in Merced, Angels Camp, Anderson, and San Francisco.

ERYSIPELAS.—Sporadic cases are reported in Sacramento, Truckee, Fresno, and St. Helena.

TYPHOID FEVER is mentioned as noticeable in Elsinore, Colfax, Sacramento, Fort Bidwell, Etna Mills, Colton, Anaheim, Redding, Truckee, Igo, Watsonville, Downieville, Millville, San Bernardino, Santa Ana, San Diego, Los Angeles, San Francisco, and Chico.

PNEUMONIA is becoming quite prominent among the prevailing disease reports, which is to be expected as the temperature lowers and the winter rains appear. With—

BRONCHITIS, it is noticed quite frequently in San Francisco, Oakland, San Bernardino, Los Angeles, Downey, Fresno, Tulare, Wheatland, Etna Mills, Lemoore, Lakeport, Truckee, Williams, Anderson, Marysville, Brownsville, Rocklin, Downieville, Igo, and other places. The type is not severe, and the disease is not epidemic anywhere.

YELLOW FEVER.—In our last report we mentioned the fact of this Board sending an expert to the frontier, to ascertain our liability to the inroad of yellow fever. Dr. Herriek having visited all the suspected points, reports that no danger is to be apprehended this year. None of the nursery products of Florida will be imported into this State until February or March, when the frost will have entirely killed the microbe upon which yellow fever is supposed to depend, consequently we run little or no danger from this source.

The Board is now engaged upon the work of ascertaining how far the prevailing diseases among cattle are dangerous to human life, and to what extent they prevail or are likely to affect the food supply of the State.

PACIFIC COAST WEATHER.

WEATHER.—The storms appearing off the Pacific Coast during October passed to the east, north of the northern boundary of the United States, and accompanying rain areas did not extend as far south as California. Rain fell in Oregon and Washington Territory on the 6th, 7th, 8th, 12th, 13th, 16th, 17th, 22d, 23d, 24th, 25th, 27th, 28th, 29th, 30th, and 31st, and local showers occurred in the same districts on the 9th, 10th, 11th, and 20th. In the extreme southern portion of California, local rains fell on the 6th, 17th, 18th, and 19th, and in Northern California there were local showers on the 30th.

TEMPERATURE.—The month has been warmer than usual over all the country west of the Rocky Mountains; the greatest departure, 8 degrees, occurring over Nevada, Utah, and eastern Washington Territory, and the least, 2 degrees, along the coast of California.

RAINFALL.—The rainfall for the month has been about the average rainfall for October in Oregon and Washington Territory, and the extreme southern part of California. In Northern California little or no rain fell during the month, except on the northern coast, where the amount was about half the normal.

NOVEMBER, 1888.

Reports for November, received from sixty-eight localities, give a mortality of nine hundred and ninety-seven decedents, in a population estimated at six hundred and fifty-four thousand four hundred, which gives a percentage of 1.5 per thousand in the month, or an annual death rate of 18 per thousand, which is above the average for the past six months, but still a very low rate of mortality for this season of the year, when acute pulmonary complaints prevail, and which in the Eastern States increase their mortality list so very largely. With the advent of the rainy season, respiratory diseases became prominent, and at once made themselves apparent in our mortality returns.

CONSUMPTION caused one hundred and forty-two deaths, about the same as in October.

PNEUMONIA, which in October produced death in but forty-seven persons, in November caused the decease of one hundred and eight, over double the number.

BRONCHITIS was fatal in twenty-two instances, which is also an increase from the last report.

CONGESTION OF THE LUNGS caused ten deaths.

DIARRHŒA AND DYSENTERY, so fatal during the summer months, have reduced their death rate to five in November, all isolated cases. Last month deaths from these diseases numbered twenty-eight, the change in the atmospheric conditions seeming to have a beneficial effect in modifying their fatality.

CHOLERA INFANTUM.—The deaths from this disease have also fallen from thirty last month to twelve in November. These were all sporadic cases, and in no locality was any epidemic tendency noted.

DIPHTHERIA made a marked advance in the number of its decedents, forty-three deaths being ascribed to it. Twenty-two of these occurred in San Francisco, six in Los Angeles, three in Napa, two each in Downey, San Diego, and Sacramento, and one each in Etna Mills, Nevada City, Pasadena, Hollister, Santa Barbara, Santa Cruz, Stockton, and St. Helena.

CROUP caused ten deaths—seven in San Francisco and three in Los Angeles—probably all diphtheric in their nature.

WHOOPING-COUGH was fatal in seven instances, which is an increase over last month's report, and indicates that the disease is increasing its area of diffusion.

SCARLET FEVER was fatal in two instances only. The disease is quite prevalent, but of an unusually mild type.

MEASLES caused no deaths.

SMALLPOX caused but one death—a child in Merced. There were no other deaths from it reported.

TYPHO-MALARIAL FEVER was fatal in nine instances.

TYPHOID FEVER had a fatality of thirty-one, fifteen occurring in San Francisco, the others in single cases throughout the State.

REMITTENT FEVER caused five deaths—one in Bakersfield, one in San Bernardino, and three in San Francisco.

CEREBRO-SPINAL FEVER caused nine deaths—five in San Francisco, one in College City, one in Colfax, one in Cottonwood, and one in Watsonville.

ERYSIPELAS was fatal in three instances.

HEART DISEASE.—Sixty-one deaths were reported from this cause.

CANCER caused twenty-four deaths.

ALCOHOLISM was fatal to ten persons.

The following towns report no deaths: Bodie, Lakeport, Roseville, Folsom, Ventura, and Wheatland.

PREVAILING DISEASES.

Reports received from eighty localities, in different parts of the State, indicate the increase of zymotic diseases, especially diphtheria, typhoid fever, scarlet fever, and a tendency to the spread of smallpox. The meteorological changes during the month of November has likewise increased all acute diseases of the respiratory organs, influenza being epidemic in many places, and pneumonia and bronchitis quite prevalent.

DIARRHŒA AND DYSENTERY show a remarkable decrease in prevalence, but sporadic cases appeared during the month in Knights Ferry, Cottonwood, Etna Mills, Redding, Wheatland, Downey, San Bernardino, Tulare, Fresno, College City, Red Bluff, and Benicia.

CHOLERA INFANTUM has practically ceased to be mentioned in our reports, two or three localities only reporting isolated cases. This fact tends to show how essentially the disease is dependent upon temperature and diet for its maintenance, or that the microbe upon which the disease is, by Hayem, said to depend, is not capable of preserving its existence in lowered temperatures. Isolated cases were noticed in Los Angeles, San Francisco, Lodi, San Bernardino, Downey, Etna Mills, Santa Barbara, and Santa Rosa.

MEASLES is reported in Newcastle and Redding.

SCARLET FEVER is prevalent in Sacramento, Sisson, Biggs, Lockeford, Auburn, Colton, Cloverdale, San Bernardino, Ophir, and San Francisco. In Auburn, Dr. Rooney writes, the disease appeared in neighboring houses, but by strict isolation of them the fever was not permitted to spread. In the town of Ophir there were several cases, with two deaths. In San Francisco only four cases were reported. In Sacramento there were many cases, owing to the want of sanitary precaution to prevent its spread. When scarlatina appears in a community the most rigid isolation should be practiced, as there is no possibility of knowing whether it is the inauguration of an epidemic that will sweep through a town like a devastating plague, or continue its progress in a benignant form. So far as heard from the disease is mild in type, but often producing death from the effects which follow the eruption.

DIPHTHERIA, we regret to say, is mentioned in many reports as present. In San Francisco as many as sixty-two cases were reported during November. It also was noticed in Oakland, Sacramento, St. Helena, Napa, Sisson, Truckee, Igo, Etna Mills, Downey, Colton, San Bernardino, Ventura, Fresno, Mariposa, Nevada City, Rocklin, Santa Cruz, Los Angeles, Pasadena, and Santa Barbara.

CROUP, twin sister of diphtheria, is reported as having been noticed in Lincoln, Sisson, Truckee, Rocklin, Fort Bidwell, Mariposa, Anaheim, Cloverdale, Ventura, and Los Angeles.

The increase in the reports of these diseases must be attributed to sanitary carelessness in the management of the cases occurring. When once diphtheria has arisen, the law of contagion carries it to the rich and poor without discrimination; to the cleanly and the uncleanly, but not to all alike. Filth fosters the disease, but cleanliness offers no inducement for its propagation. Beware of any person who has a sore throat; do not kiss or absorb the breath of any such. Do not visit the dwelling where diphtheria or croup are present, and above all, do not let your children go where it is. Diphtheria is a preventable disease, and proper sanitary and preventive measures are invariably followed by a limitation of the disorder to the place of its occurrence.

WHOOPIING-COUGH is quite prevalent in Angels Camp, Livermore, Etna Mills, Elsinore, Downey, and College City.

ERYSIPELAS, which is, in a limited sense, contagious, was noticed in Downieville, Salinas, Dixon, Truckee, Igo, Redding, Fort Bidwell, Cedarville, Red Bluff, Tulare, Fresno, and Colfax.

TYPHOID FEVER was quite prevalent during the month of November, and was noticed particularly in San Francisco, Sacramento, St. Helena, Alturas, Lodi, Anaheim, Livermore, Truckee, Etna Mills, Redding, Fort Bidwell, Elsinore, Colton, and Jolon.

The increased prevalence of this disease was not unexpected, as it has invariably taken place after the first rains, probably by the latter washing surface impurities into the drinking water. Dr. Dowling, in a paper read before the New Jersey Sanitary Association, asserted that a careful study of the cases and statistics which he examined seemed con-

clusive that at least 95 per cent of the cases of typhoid fever come directly from impure water. Sanitary care and vigilance are the only means known of preventing the disease, and wherever the slightest suspicion arises of the purity of the water, it ought to be boiled before being used. The good effect of drainage in this disease is remarkably shown in the city of San Diego; before their present complete system of sewerage was established, typhoid fever was very prevalent; now it is becoming more rarely found, and only in those places where drainage is still incomplete.

TYPHO-MALARIAL FEVER is mentioned as having a local habitation and a name in Knights Ferry, Anaheim, Lockeford, Lincoln, Igo, San Bernardino, Tulare, College City, and Fresno.

REMITTENT AND INTERMITTENT FEVERS are noticed in reports from Merced, Lincoln, Knights Ferry, Cottonwood, Rocklin, Wheatland, San Bernardino, Tulare, Newcastle, and other localities.

PNEUMONIA prevails to a great extent throughout the State. The large rainfall, with cold fogs, seems to have increased the frequency of attacks. This was particularly noticed in the valleys and coast counties, as well as above the snow line. It is mentioned in reports from Sisson, North Bloomfield, Truckee, Forest Hill, Nevada City, Igo, Watsonville, Salinas City, San Bernardino, Ventura, Elsinore, Merced, Lodi, Napa, Lockeford, Fresno, Auburn, Sacramento, San Francisco, and Jolon.

BRONCHITIS likewise prevails to a great extent throughout the State, and fortunately in those places where pneumonia is rife, the type appears to be mild and not attended by any unusual mortality, except among the aged and feeble.

INFLUENZA is also universal, but of a mild type.

SMALLPOX is still threatening our State with an epidemic, and if the missing factor in the cause that determines its diffusion were present, we have plenty of the material on hand to produce that result. In San Francisco during the month there were thirteen cases reported, one coming from Illinois, two came from New Mexico, and one from Nevada, the source of supply being quite diffused. In Santa Rosa, Dr. R. P. Smith writes they had four cases on a farm two miles south of the city. The first case came from Oakland. Eleven persons were exposed in the house; three children unvaccinated. They were vaccinated forty-eight hours ahead of the incubative period of smallpox, and all escaped with the very mildest attack of varioloid. None of those exposed, but vaccinated, took the disease. In Merced five cases of smallpox were reported; one died; the type was very mild. Quarantine measures being instituted, it is hoped the disease will not spread, as vaccination of all unprotected persons was at once begun, and will be kept up until each one availing himself of the opportunity is protected.

PACIFIC COAST WEATHER.

SIGNAL SERVICE U. S. ARMY, DIVISION OF THE PACIFIC, SAN FRANCISCO, December 1, 1888. WEATHER.—The storms on the Pacific Coast, during the past month, have been noteworthy for the general absence of high winds, and for the low latitude in which many of them were first observed. To this latter circumstance is due the abundant rainfall in California during the month, and the comparatively small rainfall in the northern districts.

TEMPERATURE.—The mean temperature for the month has been slightly higher than the normal temperature for November in all districts west of the Rocky Mountains. The greatest departure from the normal temperature (averaging about 5 degrees) occurred in northern Nevada, and the least in Washington Territory.

RAINFALL.—The monthly rainfall has been in excess throughout California, and has been less than the normal amount in Oregon and Washington Territory. The marked increase in precipitation, with increased latitude, which is usual on the Pacific Coast, did not appear in November, the rainfall at Los Angeles in the south being nearly equal to that of Portland in the north.

DECEMBER, 1888.

Mortality reports received from seventy-five cities and towns within the State give collectively the number of decedents as nine hundred and seventeen, in an estimated population of seven hundred thousand six hundred, exclusive of those towns reporting *no deaths*, having a population of ten thousand five hundred, so that actually in a population of seven hundred and nineteen thousand one hundred, the mortality gives the exceedingly low percentage of 1.27 per thousand for the month of December, when the death rate is expectedly increased everywhere within the temperate zone. If our mortality reports were reported as they should be, from every village and town in the State, we have no doubt the same condition of diminished mortality would be found. We trust the Legislature will see the importance of so amending our health laws that reliable statistics may be obtained, as by them we can demonstrate clearly the advantages of California as a health resort.

CONSUMPTION caused during the month one hundred and thirty-seven deaths, which is a decrease from last report.

PNEUMONIA was very much less fatal during the month, causing only ninety deaths in December, against one hundred and eight in November, which is quite a decrease.

BRONCHITIS shows a slight increase, thirty-one deaths being attributed to it.

CONGESTION OF THE LUNGS was fatal in eight instances.

DIARRHŒA AND DYSENTERY caused only three deaths, which indicates how closely identified these diseases are with atmospheric changes.

CHOLERA INFANTUM caused but three deaths.

DIPHTHERIA continues its fatal tendency, thirty-four deaths being reported during the month. Of these only fourteen occurred in San Francisco, five in Los Angeles, three in Colton, two in Napa, two in Oakland, one each in Alameda, Downey, Petaluma, Sacramento, Santa Ana, Santa Barbara, Santa Cruz, and Vallejo.

CROUP was nearly as prevalent as diphtheria, twenty-two deaths being ascribed to it, seven occurring in San Francisco, four in Sacramento, six in Los Angeles, three in Oakland, one in Downey, and one in Forest Hill.

WHOOPIING-COUGH was fatal in four instances.

SCARLET FEVER caused three deaths—two of them in Sacramento and one in San Francisco.

MEASLES caused no deaths.

SMALLPOX caused two deaths in San Francisco; one also occurred in Stockton, but does not appear in the report from that city.

TYPHO-MALARIAL FEVER.—Four deaths are attributed to this disease.

TYPHOID FEVER caused thirty-six deaths in December, which is a slight increase from last report. Twelve occurred in San Francisco, four in Sacramento, four in Los Angeles, two each in Fresno, Oakland, and Santa Barbara, and one each in Vallejo, Truckee, Sisson, Santa Rosa, San Diego, Redding, Pasadena, Elsinore, and Chico.

REMITTENT FEVER is credited with five deaths.

CEREBRO-SPINAL FEVER is reported to have caused seven deaths.

CANCER caused twenty-three deaths.

HEART DISEASE.—Sixty deaths were caused by it.

ALCOHOLISM was fatal to eleven persons during the month.

The following towns report *no deaths*: Anaheim, Brownsville, Bodie, College City, Cloverdale, Downieville, Igo, Lincoln, Lodi, Newcastle, Nicolaus, Roseville, and Williams.

PREVAILING DISEASES.

Reports received from sixty-five towns indicate, with few exceptions, that the amount of sickness is very limited, and what does prevail is of a mild and not a serious character. This may be owing to the favorable temperature throughout the month, which was not characterized by any sudden changes.

DIARRHŒA AND DYSENTERY have subsided almost everywhere. Sporadic cases are reported as occurring in Tulare, Fresno, Nicolaus, Lemoore, Anderson, and Downey.

CHOLERA INFANTUM is almost entirely absent from the State, or so seldom met with that it is no longer reported.

MEASLES is reported in Red Bluff, Sisson, Salinas, and Elsinore. The number of cases is very limited, and it is no longer epidemic.

SCARLET FEVER is more widely diffused, but in a very mild form. It was present in Red Bluff, Visalia, Napa, Sacramento, San Francisco, Salinas, Cottonwood, Livermore, Biggs, Anderson, and Cloverdale.

DIPHTHERIA occupies quite an extensive range. It was present in Sacramento, San Francisco, Oakland, Alameda, Colton, Downey, Los Angeles, Napa, Petaluma, Santa Ana, Santa Barbara, Santa Cruz, Vallejo, Tulare, St. Helena, Newcastle, Sisson, Colfax, Igo, Wheatland, Anderson, and Elsinore. Dr. H. N. Miner, writing from Colfax, says that thirteen cases came under his observation during the month, but the type was mild. We have yet to learn upon what factor or factors the type of an epidemic depends, and, again, to what we owe the appearance of certain diseases in regular cycles, appearing and disappearing with a certain regularity that so far has baffled the sanitarian.

CROUP accompanies diphtheria with unflinching regularity, almost compelling us to believe in the identity of the diseases. It was reported in Williams, Anderson, Cloverdale, Downey, Forest Hill, Los Angeles, Oakland, Sacramento, and San Francisco.

WHOOPIING-COUGH was in North Bloomfield, Lodi, Angels Camp, Anderson, Downey, Placerville, and San Francisco.

ERYSIPELAS was observed in Red Bluff, Fresno, College City, Cedarville, Newcastle, Downieville, Sierra City, Lincoln, Truckee, and Lockeford.

TYPHOID FEVER was noticed in reports from San Francisco, Tulare, Fresno, Newman, North Bloomfield, Salinas, Wheatland, Cottonwood, Colton, Sisson, Anaheim, Fort Bidwell, Lakeport, Igo, Jolon, Anderson, Bakersfield, Elsinore, Chico, Los Angeles, San Diego, Sacramento, Oakland, Truckee, and Vallejo. The range over which typhoid fever prevails would indicate that sanitary defects exist in these places that ought to be remedied. Typhoid fever is, of all diseases, the most preventable, and if the Sanitary Inspector, which the State hopes to appoint according to law, does nothing but instruct the people how to keep clean and prevent the development of typhoid, he will have earned his salary and saved the State many thousands of dollars.

REMITTENT FEVER is mentioned as prevailing in many places, but its type is not severe and mortality very limited.

PNEUMONIA still prevails to a considerable extent, but is not nearly so prevalent as it was in November.

BRONCHITIS was more frequent in Red Bluff, Sacramento, Fresno, College City, Calistoga, Watsonville, Sierra City, Bodie, Redding, Brownsville, Lockeford, Oakland, Alameda, and San Francisco.

SMALLPOX was in Merced City, but the place is now free from it. There are, however,

three additional cases quarantined in the pesthouse three and one half miles from town. In Mendocino City there is one case only in the pesthouse, now convalescing. In Stockton one case occurred, which came from San Francisco. Since his death no new cases have appeared. In Los Angeles two cases of varioloid were recorded at the pesthouse, which are now convalescent, and no further cases have appeared in the city. In San Francisco they had a few cases that were promptly isolated. No new case has appeared since December 29, 1888. No further reports of this disease have been recorded.

PACIFIC COAST WEATHER.

WEATHER.—Less than the usual number of storms appeared on the Pacific Coast during December, but those, as a rule were well defined, and occurred in lower latitudes than usual. As a result, the number of days in which rain fell has been slightly in excess of the normal number in California, while in Oregon and Washington Territory there has been an unusual amount of fair weather.

TEMPERATURE.—The mean temperature for the month was slightly above the normal December temperature in all the Pacific Coast districts. The departures were small in all cases, however, the greatest, 4 degrees, occurring in southern Oregon. Mean monthly temperatures at selected stations are as follows: Olympia, W. T., 42 degrees; Portland, Or., 44 degrees; Roseburg, Or., 46 degrees; Red Bluff, Cal., 43 degrees; Sacramento, 43 degrees; San Francisco, 52 degrees; Los Angeles, 55 degrees.

RAINFALL.—In California the rainfall has been in excess of the December rainfall, while in Oregon and Washington Territory it has amounted to but little more than one half the usual amount, except in eastern Washington Territory and northeastern Oregon, where the departures from the normal are small.

JANUARY, 1889.

Reports of mortality received from sixty-six cities and towns, with an estimated population of seven hundred thousand eight hundred and fifty, give the number of deaths as nine hundred and ninety-two, being a percentage of 1.41 per thousand in the month, or an annual death rate of 16.92, which is an increased percentage over the mortality of several previous months. The increased deaths from diseases of the respiratory organs will, in a measure, account for the increase, deaths from zymotic disease being rather below the usual average.

CONSUMPTION.—Deaths from this disease reach one hundred and sixty-five, an increase of twenty-eight over the month of December.

PNEUMONIA was very fatal, one hundred and three deaths being attributed to it.

BRONCHITIS also shows an increased death rate, thirty-four decedents from it being reported during the month.

CONGESTION OF THE LUNGS caused the death of twelve persons, which is also an increase, so that we are warranted in attributing our augmented death rate to local more than to general sickness.

DIARRHŒA AND DYSENTERY were fatal in seven instances.

CHOLERA INFANTUM again appears in our reports, six deaths being attributed to it.

DIPHTHERIA is reported to have caused twenty-one deaths. Of these, four occurred in San Francisco, six in Oakland, three in Santa Cruz, two in Colfax, and one each in Los Angeles, Elk Grove, Ventura, Stockton, Mendocino, and San Bernardino.

CROUP was more fatal than diphtheria, twenty-two deaths being ascribed to it. Of these, two occurred in Vallejo, eight in San Francisco, five in San Leandro, and one each in Los Angeles, Santa Barbara, Riverside, Oakland, Fresno, Anaheim, and Alameda.

WHOOPING-COUGH caused seven deaths.

SCARLET FEVER was fatal in one instance.

MEASLES caused no deaths.

SMALLPOX caused two deaths in San Francisco and one death in San Leandro during the month. No other deaths from it were reported.

TYPHO-MALARIAL FEVER was fatal in one instance.

TYPHOID FEVER is reported as the cause of twenty-nine deaths. This is a decrease from the mortality in December, San Francisco reporting only six deaths, Los Angeles reports six deaths, Santa Ana three, Mendocino three, Jolon two, and Anaheim, Bakersfield, Colton, Lodi, Oakland, Placerville, Santa Barbara, St. Helena, and Vallejo, one each.

REMITTENT FEVER caused three deaths, one in Placerville, one in San Bernardino, and one in Pasadena.

CEREBRO-SPINAL FEVER is credited with eleven deaths, which is an increase over last report. Four of these occurred in Stockton, two in Oakland, and one each in San Francisco, Lemoore, Mendocino, Redding, and Santa Cruz.

CANCER was fatal in twenty-eight instances, which is about the monthly average.

HEART DISEASE caused seventy-one deaths, which is an increase over last month.

ALCOHOLISM.—Eleven deaths were attributed to this cause.

The following towns report *no deaths* during January: Anderson, Biggs, Igo, Gonzales, Livermore, Newcastle, Sisson, and Elsinore.

PREVAILING DISEASES.

Reports received from seventy-two different localities are unanimous in reporting the absence of any noticeable amount of sickness beyond that which might be expected in the natural course of events. The weather during the month presenting no sudden changes, and the rainfall below the normal, the effect upon the type of diseases was most favorable, especially those confined to the alimentary canal, as we find that—

DIARRHŒA AND DYSENTERY are not mentioned as prevailing in any district. Some sporadic cases were noticed in Anderson, Lemoore, Fresno, Nicolaus, and College City. The type was quite mild and amenable to simple treatment.

CHOLERA INFANTUM is not mentioned in a single report received, which shows its general absence within the State, or at least in such a limited number of cases that its presence is not noteworthy.

MEASLES is reported in Merced and Newman in limited numbers and in mild form.

SCARLET FEVER was noticed in Sacramento, Napa, Anderson, Truckee, and Santa Ana. The type was mild, and the numbers attacked were very limited.

DIPHTHERIA is reported in various localities. In San Francisco it was not so prevalent during the month. It was quite frequently noticed in Oakland, Alameda, Elsinore, San Leandro, Santa Cruz, Fresno, Napa, Colfax, Truckee, Anderson, St. Helena, Igo, Etna Mills, Elk Grove, Los Angeles, Mendocino, San Bernardino, Stockton, and Ventura. The impression seems to be very general that the frequency of this disease is in the main dependent upon bad sewerage, defective drains, foul air, and unsanitary conditions generally. Although these conditions may render the persons exposed to them more liable to take the disease from the deteriorating influence upon the general health which such surroundings produce, yet they do not generate diphtheria, nor is the disease capable of spontaneous generation any more than is smallpox or cholera. In order to produce diphtheria you must have the germ of the disease present, and then to be developed it must come in contact with a suitable soil for its growth. From this fact the inference is plain that although prudence requires that the sanitary condition of the patient's surroundings be kept in the best possible condition, and all predisposing causes which might deteriorate the patient's health be removed, it is infinitely more important to insist upon the complete isolation of those attacked, and the rapid destruction by fire of all substances likely to be the conveyancers of contagious germs. Diphtheria germs, as far as can be ascertained, are aerobic; they are carried in the air, exhaled by the breath, deposited on the clothes, on the walls, everywhere in the room; hence the necessity for the most thorough disinfection of the person and the dwelling before intercourse with well persons is allowed. If more care were exercised in this regard we would hear less of the disease, and many very valuable lives saved that are now sacrificed by criminal carelessness, and the utter disregard for the public welfare.

CROUP prevailed co-extensively with diphtheria, and wherever the one was noticed the other was in close proximity. There is no doubt of the identity of these diseases when the croup is of the membranous form, and the same precautions ought to be taken to prevent its diffusion as are proper and requisite in diphtheria. There is a fair chance of recovery in diphtheria, but membranous or diphtheritic croup is nearly always fatal; hence the urgent necessity of taking every precaution to prevent its spread by proper disinfection.

WHOPING-COUGH is reported in Lodi, Elsinore, Anaheim, North Bloomfield, Los Angeles, Placerville, and San Francisco.

ERYSIPELAS.—Sporadic cases of this disease were reported in Sacramento, College City, Fresno, Truckee, Anderson, Bodie, St. Helena, Igo, Cottonwood, Sisson, Downieville, Newman, Los Angeles, Ventura, and San Francisco.

TYPHOID FEVER is noticed in reports from Anaheim, Bakersfield, Colton, Jolon, Lodi, Los Angeles, Mendocino, Oakland, Placerville, San Francisco, Santa Ana, Santa Barbara, St. Helena, Vallejo, Etna Mills, Cottonwood, Igo, Truckee, and Fresno. As this disease is in truth a filth disease, and is propagated in foul air, sewer gas, and all emanations from decomposing animal matter, its presence is surely indicative of a lack of sanitary care in the place developing it. No sanitary improvement worth the name will, however, be effective, unless you can create an intelligent interest in the matter among the people at large. You cannot make populations cleanly or healthy against their will, or without their intelligent cooperation.

PNEUMONIA was quite prevalent during the month, and is mentioned in reports from Dixon, San Bernardino, College City, North Bloomfield, Colton, Fresno, Merced, Newman, Napa, Lockeford, Lemoore, Watsonville, Colfax, Truckee, Anderson, Igo, Cottonwood, Etna Mills, Wheatland, Elk Grove, Sacramento, San Francisco, San Diego, Santa Ana, Santa Rosa, Placerville, Oakland, Marysville, Los Angeles, Grass Valley, and Berkeley.

BRONCHITIS likewise prevailed more or less over the State. Its type was not severe.

INFLUENZA prevails extensively, accompanied by a great deal of bronchial catarrh. Apart from the great prostration induced, its type is not severe.

SMALLPOX still appears here and there throughout the State. There were some cases reported during the month in San Francisco. A case was also reported five miles below St. Helena. Dr. Dawson says no others have occurred. A case was also detected in Oakville, near Napa; three cases developed in Merced. One case is about two miles from San Leandro, in the poorhouse, and in one family no fewer than eleven persons had the disease. Dr. Dubois writes that these people, who were under his care, came from Milwaukee, and the disease was contracted on the way to California. Of these eleven, one died; the others are now convalescent. A case was also discovered in Placerville, which was promptly

isolated and quarantined, so that an extension of the disease is not anticipated. These isolated cases indicate that smallpox germs are well scattered over the State, and require simply suitable soil for their cultivation and development. Vaccination should be generally adopted in every city, town, and village in the State, as the season is now favorable for disease germs to propagate, and there is no knowing how soon an epidemic may ensue. By efficient vaccination this can be avoided and smallpox shorn of its strength. No delay should be exhibited in this matter, which is one of vital importance.

PACIFIC COAST WEATHER.

WEATHER.—Fair weather has prevailed during the month to an unusual extent along the entire Pacific Coast. Rain fell at regular intervals in Oregon and Washington Territory until the twenty-fourth of the month, being followed by an entire week of clear weather. In California rain fell as follows: In Northern California, on the 3d, 4th, 10th, 11th, 12th, 17th, 20th, and 21st. In Southern California, on the 5th, 12th, 13th, 14th, 15th, and 16th.

TEMPERATURE.—The mean temperature of the month has been about normal in all districts, being slightly higher than usual along the immediate coast, and slightly lower than usual over the interior. Mean temperatures at selected stations are as follows: Portland, Oregon, 39 degrees; Roseburg, Oregon, 41 degrees; Red Bluff, California, 46 degrees; Sacramento, 55 degrees; San Francisco, 49 degrees; Fresno, 44 degrees; Los Angeles, 51 degrees, and San Diego, 52 degrees.

RAINFALL.—The rainfall has been less than usual in all districts, markedly so, except in the extreme southern portion of California, where it was very nearly normal.

FEBRUARY, 1889.

Mortality reports have been received from sixty-seven localities, with an estimated population of six hundred and sixty-five thousand seven hundred. The total number of deaths reported was eight hundred and fifty-nine, which gave a percentage of 1.29 per thousand in the month, or an annual death rate of 15.48, which is an unusually small percentage for the season of the year, and indicates the absence of any epidemic disease upon the coast.

CONSUMPTION is credited with one hundred and sixty-five deaths, the same number that occurred in January, and an increase over the general average. The possibility of lessening our mortality from this disease, by preventive measures, will be presented in another portion of these remarks.

PNEUMONIA caused ninety-two deaths, which is a decrease from last report, but indicates a great frequency of the disease and severity of type.

BRONCHITIS was fatal in twenty-two instances. These deaths, with but one exception, occurred in the coast counties.

CONGESTION OF THE LUNGS caused seven deaths; mostly among children.

DIARRHEA AND DYSENTERY are credited with five deaths; three of them in San Francisco, one in Downey, and one in Monterey, which indicates the infrequency of these diseases at the present time.

CHOLERA INFANTUM caused four deaths, all sporadic in nature, and occurring each one in different sections of the State.

DIPHTHERIA is reported as causing thirty-two deaths, an increase of one third over those of January. Of these, ten occurred in San Francisco, six in Los Angeles, four in Downey, three in Oakland, three in St. Helena, two in Colfax, and one each in Ventura, Truckee, Santa Barbara, and Sacramento.

CROUP had also a fatality of eleven cases, which is a decided decrease from last report. Five of these occurred in San Francisco, two in Downey, two in Ventura, and one each in Anaheim and Oakland.

WHOOING-COUGH was fatal in but one instance, and that in Oakland.

SCARLET FEVER caused one death in Oakland.

MEASLES caused one death in San Francisco.

SMALLPOX caused one death in San Francisco. No other deaths from it were reported.

TYPHO-MALARIAL FEVER was fatal in one instance only.

TYPHOID FEVER had also the small mortality of twenty-one. Of these, ten occurred in San Francisco, three in Los Angeles, three in Davisville, two in Santa Barbara, and one each in Anaheim, Oakland, and Sacramento.

REMITTENT FEVER is credited with one death.

CEREBRO-SPINAL FEVER.—To this cause is attributed fourteen deaths. Four occurred in San Francisco, one each in Biggs, Cottonwood, Cloverdale, Grass Valley, Gridley, Riverside, Sacramento, Sisson, Stockton, and St. Helena, which is an increased mortality over January.

CANCER caused twenty-six deaths, which is about the average monthly mortality.

ERYSIPELAS was fatal in four instances.

HEART DISEASE caused sixty-one deaths.

ALCOHOLISM was fatal in ten instances.

The following towns report *no deaths* in February: Bodie, Downieville, Elk Grove, Elsinore, Igo, Lower Lake, Millville, Monrovia, National City, Newman, Shasta, and Trinity.

PREVAILING DISEASES.

Reports received from seventy-five localities in different parts of the State indicate an unusual absence of sickness, with the exception of pulmonary diseases, which are rather prevalent in many places, especially influenza, which seems to be almost universal. As it has no very dangerous tendency, and depends more on meteorological conditions than infection for its diffusion, it can hardly be included among the zymotic diseases.

PNEUMONIA is noted in reports from Gridley, Lockeford, San Bernardino, Elsinore, Monrovia, Elk Grove, Sacramento, Downeyville, Millville, Cottonwood, Anderson, Sisson, Ione, Lemoore, Merced, Fresno, Calico, Watsonville, Napa, Alameda, Bakersfield, Colton, Grass Valley, Oakland, Salinas, San Diego, and San Francisco. In Placerville, Dr. J. Q. Wrenn writes that pneumonia has almost been epidemic, many cases being of a marked typhoid character, which much increased its fatality. Its frequency is now abating, and influenza becoming more frequent. The disease was also quite prevalent in San Francisco and along the coast.

BRONCHITIS is noted in the reports quite frequently, especially in Lockeford, Lakeport, Newcastle, Cloverdale, Anaheim, Cottonwood, Williams, Wheatland, Lemoore, Bodie, Brownsville, Downey, Fresno, Monterey, Merced, Sisson, Truckee, Biggs, Napa, Ione, Watsonville, Fort Bidwell, Los Angeles, Oakland, and San Francisco.

WHOOPIING-COUGH is prevalent in Oakland, Newcastle, Brownsville, Santa Cruz, Merced, and Downey. The type is mild and the mortality very limited.

DIARRHŒA AND DYSENTERY cannot be said to prevail anywhere. A few cases occurred in Red Bluff, Fresno, Calico, Monterey, Ione, Knights Ferry, Lemoore, Downey, and San Francisco.

CHOLERA INFANTUM is also almost absent from the State. Sporadic cases occurred in Monterey, San Francisco, San Diego, Redding, Oakland, Merced, and Ione. In other reports it is not mentioned. As spring advances and the temperature increases we may expect a return of the disease to our sickness reports, until such time as mothers become familiar with household hygiene, when we hope to see the affection disappear from our list of prevailing diseases.

MEASLES was noticed in reports from Gridley, Merced, Sisson, and Oakland.

SCARLET FEVER, in a mild form, was present in Sacramento, San Francisco, Chico, Calico, Fresno, Lockeford, Santa Cruz, Ione, Igo, Biggs, Napa, and Oakland.

DIPHTHERIA continues to be reported in Los Angeles, Ventura, Anaheim, Downey, San Bernardino, Salinas, Fresno, Napa, St. Helena, Santa Cruz, Truckee, Millville, Etna Mills, Anderson, Oakland, and San Francisco. In the latter city thirty-four cases were reported during the month, which is a decrease. The importance of isolation in these cases is beginning to attract the notice of the public, and when we consider that the disease is almost as contagious as smallpox, and twice or perhaps three times as fatal, too much care cannot be taken in confining the disease within as narrow a compass as possible.

CROUP is now generally considered, in the membranous form, to be identical with diphtheria elsewhere. In our reports it is noticed in San Bernardino, Cloverdale, Anaheim, Knights Ferry, Downey, Colfax, Fresno, and other places where diphtheria prevails. In all cases it should be treated as an infectious disease, and precautions taken accordingly.

ERYSIPÉLAS, another zymotic disease, is mentioned in reports from Lockeford, Millville, Anaheim, Truckee, Brownsville, Lower Lake, Downey, Calico, Fresno, Oakland, and San Francisco. The type is mild.

TYPHOID FEVER is not prevalent anywhere. Sporadic cases are noticed in San Francisco, Oakland, Sacramento, Anaheim, Davisville, Los Angeles, Santa Barbara, Gridley, Monrovia, Igo, Brownsville, Etna Mills, Red Bluff, and Cottonwood.

SMALLPOX is abating in a very gratifying manner. In San Francisco there was but one case during the month of February. Dr. Wrenn, writing from Placerville, reports that five cases occurred during the month. These all seemed to have originated from a lady who died after a few days' illness with what was supposed to be pneumonia; it was more likely hemorrhagic smallpox, as the first one taken with undoubted variola was her son, and soon after the priest who attended her was stricken with confluent smallpox. Although many persons were exposed to the disease, it has not spread, vaccination being at once resorted to. One case was reported in or near Stockton. There was also a case reported by Dr. O. Barton, of Truckee, in the person of a colored waiter, who had come ten days before from Carson. He was waiting at dinner when the pustules were noticed upon him. He was at once isolated and quarantined. In Merced, two cases were reported as convalescing. No other reports of smallpox have been received.

CONSUMPTION.—In view of the wide distribution of this disease, unconfined to any one portion of the State, but being particularly noticed in the southern portion, from the large immigration of these sufferers to that genial climate, it is deemed of importance to give the conclusions of Dr. G. Cornet upon the infectiousness of the disease. His researches show conclusively that the virus of consumption is not ubiquitous, but arises and remains concentrated about phthisical patients. A consumptive patient only becomes dangerous when the most elementary rules of hygiene are neglected. Of the discharges from a consumptive patient, it is only the sputum which is dangerous. The expectoration, as long as it is moist, is devoid of danger. If the sputum is spat into spitting cups, there is no risk. The cup should be kept covered, except when in use, not to prevent evaporation, but to keep out flies, which have been known to carry the virus about on their feet. The great danger arises when the patient expectorates on the floor

or in a handkerchief. In these cases, the sputum dries, is pulverized, and carried about by the winds, and if inhaled by a person susceptible to the disease, will undoubtedly produce the effects of *inoculation*. Dr. Cornet is also of the opinion that the patient is, by indiscriminate expectoration, even more dangerous to himself than to his surroundings; that he can poison himself, and that the inhalation of a few bacilli more, and consequent starting of a fresh foci of disease in his lungs, may determine the speedy end of his life. From these remarks it can be seen how very important it is that the expectoration of all consumptives should be speedily disinfected, especially in hotels, pleasure resorts, and sanitariums, which invalids seek for health's sake. Until this is methodically and effectually done, we can hope for no advance in the limitation of a disease which is preventable, and which, Dr. Cornet says, kills one seventh of the entire population.

PACIFIC COAST WEATHER.

WEATHER.—Few storms appeared on the Pacific Coast during the month, and these were, as a rule, of short duration, and were accompanied by little precipitation. Rain fell in Oregon and Washington Territory on the 13th, 14th, 15th, 17th, 18th, 19th, 20th, 23d, and 27th; in Northern California on the 6th, 15th, 16th, 17th, 23d, and 25th, and in Southern California on the 14th, 15th, 16th, 24th, and 25th.

TEMPERATURE.—The mean temperature was higher than the average February temperature at all stations on the Pacific Coast, departure from the normal temperature being about six degrees for stations in Oregon and Washington Territory, and about three degrees for those in California. Mean monthly temperatures at selected stations were as follows: Portland, Or., 44 degrees; Roseburg, Or., 45 degrees; Red Bluff, Cal., 52 degrees; Sacramento, Cal., 50 degrees; San Francisco, 52 degrees; Fresno, Cal., 50 degrees; Los Angeles, Cal., 55 degrees; San Diego, Cal., 55 degrees.

RAINFALL.—The rainfall was markedly below the normal February rainfall in all districts, the departures ranging from about seven inches in the vicinity of Puget Sound to about one inch in the extreme southern part of California. At all stations in the western part of Oregon and Washington Territory the rainfall was less than that for any February since the commencement of observations. The rainfall, though light, was well distributed, both as regards the territory covered and in time, thus securing the maximum benefit to growing crops.

MARCH, 1899.

Reports of mortality received from seventy-four localities, with an estimated population of seven hundred and forty-one thousand five hundred, give, in the aggregate, nine hundred and seven deaths, which is a percentage of 1.24 per thousand in the month, or an annual death rate of 14.88 per annum. If we compare this percentage with that of any other State within the Union, we will at once begin to realize the salubrity of our climate and the lessened tendency to death that exists within its borders. There is hardly a State that can be named whose death rate for the month of March comes within 1 per cent of our average, and when we reflect that 1 per cent means ten thousand lives spared in each million persons per annum, we no longer wonder at the large number of immigrants that seek our shores.

CONSUMPTION caused the death of one hundred and fifty-seven persons, or nearly one sixth of the total mortality for the month; nearly all occurring in those who came into the State already suffering from the disease.

PNEUMONIA was fatal in seventy-six instances, which is a large decrease from the last report, but nevertheless indicates a great frequency of the disease.

BRONCHITIS is reported to have caused nineteen deaths, which also shows a decrease.

CONGESTION OF THE LUNGS is credited with seven deaths.

DIARRHŒA AND DYSENTERY were fatal in but two instances.

CHOLERA INFANTUM.—Five deaths are reported from this disease.

DIPHTHERIA was fatal in twenty-three instances. Of these, only eight occurred in San Francisco, three in Oakland, three in Los Angeles, two in Downey, two in Grass Valley, and one each in Auburn, Castrolville, Salinas City, Mendocino, and Nevada City. The deaths from this disease are more numerous than from any other zymotic disease upon the coast, showing sanitary carelessness somewhere.

CROUP had a fatality of seven—four in San Francisco, one in Los Angeles, one in Cloverdale, and one in Oakland.

WHOPING-COUGH caused four deaths, which is an increase over last report.

SCARLET FEVER was fatal in eight cases—two in San Francisco, two in Oakland, two in Fresno, one in Nevada City, and one in Santa Ana.

MEASLES caused five deaths during the month.

SMALLPOX.—No deaths were reported from this disease.

TYPHO-MALARIAL FEVER was fatal in but two instances.

TYPHOID FEVER had the remarkably small mortality of eighteen persons credited to it during the month.

REMITTENT AND INTERMITTENT FEVERS caused no deaths.

CEREBRO-SPINAL FEVER.—To this cause is attributed four deaths, all sporadic, and in different sections of the State.

CANCER had its usual average mortality of twenty-five.

ERYSIPELAS was fatal in three instances.

HEART DISEASE is credited with the large mortality of eighty-six.

ALCOHOLISM was fatal in five instances.

The following towns report *no deaths* in March: Bodie, Dixon, Downieville, Livermore, Wheatland, North Bloomfield, Rocklin, Roseville, Lincoln, and Georgetown.

PREVAILING DISEASES.

Reports of sickness from seventy-nine localities show a remarkable absence of any epidemic, or indeed of any very prevalent disease, if we may except pneumonia, bronchitis, and influenza, which were very general in their diffusion, but of a mild type and sporadic character. The temperature of the month being much warmer than what we usually experience in March, and the rainfall being somewhat in excess, may have had a modifying influence upon the character of these diseases, as it has been conclusively shown that the prevalence of coughs, colds, bronchial and rheumatic affections depend very much upon temperature—a very moist atmosphere accompanied by a low temperature being conducive to their frequency, an increase of temperature lessening their fatality. It was noticed during the month that when the atmosphere was dry, and the temperature low, an increase of acute pneumonia was developed, and in the higher altitudes it seemed to determine its fatality. The connection between meteorological conditions and disease is still a problem to be solved, and appears to be worthy the attention of every votary of science whose mission is to consider all the influences affecting the public health.

PNEUMONIA is mentioned in reports from Sacramento, San Francisco, Oakland, Vallejo, Dixon, Downieville, Napa, Castroville, Anderson, Redding, Lakeport, Tulare, Merced, Hanford, Angels Camp, Etna Mills, Fort Bidwell, College City, Fresno, Cloverdale, Chico, Oroville, Santa Ana, San Diego, Grass Valley, and Red Bluff, where Dr. John Fife noticed it was very prevalent.

BRONCHITIS was also noted by its frequency in Downey, Williams, Lodi, Lemoore, Wheatland, Redding, Tulare, Salinas, College City, Fresno, Cedarville, Los Angeles, Brownsville, and San Francisco.

WHOOPIING-COUGH is observed in Lodi, Tulare, Angels Camp, Brownsville, Fresno, Oakland, and Auburn, where Dr. Rooney writes it prevails extensively.

CHOLERA INFANTUM is almost absent from the State. A case or two was observed in Knights Ferry, Lemoore, Napa, and Sacramento. The frequency of this disease depending more upon alterations of temperature, and especially upon a continuous high temperature, we would not expect a very great prevalence of it at this season of the year.

DIARRHŒA AND DYSENTERY are also mentioned but seldom in the monthly reports. There were some cases observed in Wheatland, Lemoore, Tulare, Etna Mills, Fresno, Red Bluff, Gridley, Colton, and San Diego; but, generally speaking, it is not at all a prominent disease in the State at present.

MEASLES.—A few cases of this disease were noticed in Lincoln, Wheatland, Truckee, Livermore, Angels Camp, Etna Mills, and Oakland.

SCARLET FEVER was present in Igo, Ione, Tulare, Salinas, Dixon, Oakland, San Francisco, Fresno, Santa Ana, and Sacramento. As the tendency to infection from this disease lessens with advancing years, the longer a child can be protected from it the greater the likelihood that it will escape it entirely. To obtain this desirable end it is absolutely necessary to isolate patients as soon as the disease is discovered; and this isolation must be maintained until the shedding of the epithelium or outer skin is completed. It is a well known fact that scarlet fever patients are most dangerous to others when the skin is beginning to desquamate, or peel off. During this time they should be frequently bathed, and their skin afterwards anointed with fresh lard, or other animal oil, which will hinder the dissemination of the branny scales. Children exposed to scarlet fever should remain under observation ten or twelve days before being allowed to mingle with other children, and all attendants on the sick should change their garments, and disinfect their hands, face, and hair by washing in a disinfectant solution before mixing with the public. It must not be forgotten that the type of the disease in one person is not certain to reproduce the same in another, as what is so mild as scarcely to confine to bed in one person, may communicate a poison to another that will be so very malignant as to cause death in a few hours. It is, therefore, the part of prudence to confine the spread of the disease to within as small a radius as may be possible. To determine the most infective period of the disease, Dr. Whiteleg, of London, analyzed one thousand seven hundred cases, of which he had exact particulars, and found the infectiveness suddenly decreased at about the sixth day, increased again about the twelfth day, and reached its maximum on the sixteenth day.

DIPHTHERIA continues to be noted in several localities, but in no place has it assumed epidemic proportions. In San Francisco twenty-two cases were reported during the month, which indicates a marked decrease in the frequency of the disease there. It is also reported in Auburn, Castroville, Cloverdale, Colfax, Truckee, Redding, Anderson, Downey, Tulare, Salinas City, St. Helena, Grass Valley, Los Angeles, and Oakland. In many of these localities the cases were returned as *croup*, which are here included in the term diphtheria, modern experimental pathology tending unequivocally to show their identity. Many of our reports mention a prevalence of sore throat, which may be or may not be diphtheritic, as it is now ascertained that the presence of a membrane is not essential to constitute a true diphtheria, it being many times expressed without its local manifestation in the throat, but apparent in the swollen cervical glands.

ERYSIPELAS is mentioned as appearing in sporadic form in Downey, Truckee, Lemoore, Tulare, College City, Cedarville, Oakland, and San Francisco.

TYPHOID FEVER is not prevalent in any locality. Our reports for the past month are singularly free from its mention. In San Francisco and Oakland a few cases are noted; also in Alameda, Etna Mills, Colfax, Los Angeles, and Red Bluff.

TYPHO-MALARIAL FEVER was observed in Cottonwood, Lodi, Anderson, Igo, Tulare, College City, Fresno, Knights Ferry, and Gridley. The type was very mild and the mortality nominal.

SMALLPOX still continues to show itself here and there within the State. In San Francisco three cases were reported, one of whom came from Portland, Oregon, one from San Rafael, and one from Sacramento. In Hanford, Tulare County, a case appeared on the fifteenth of the month. This was followed by two others in the same dwelling; all were of the confluent variety; no other cases have as yet developed. There is one case in Truckee, which is convalescing. Dr. J. Q. Wrenn writes that the disease has entirely disappeared from Placerville, and Dr. C. A. Ruggles assures us that there is not a single case in Stockton or vicinity. No other reports of smallpox have been received, and we hope soon to record the fact that it is absent from the State.

PACIFIC COAST WEATHER.

WEATHER.—From the seventh to the twentieth of the month a rapid succession of storms appeared, giving rain along the entire Pacific Coast. These storms were accompanied in many cases by high winds, noticeable on the days from the twelfth to the eighteenth. During the periods preceding and following this series of storms, warm, fair weather prevailed, broken by occasional showers.

TEMPERATURE.—The month has been much warmer than usual over the country west of the Rocky Mountains. The greatest departures from the normal temperature occurred in central Oregon, where there were about 8 degrees. In California the mean monthly temperature ranged from 3 degrees to 4 degrees above the normal. Mean temperatures at selected stations were as follows: Portland, Oregon, 53 degrees; Roseburg, 52 degrees; Red Bluff, California, 57 degrees; Sacramento, California, 56.5 degrees; San Francisco, California, 55.5 degrees; Fresno, 57 degrees; Los Angeles, 56.5 degrees; San Diego, 57.5 degrees.

RAINFALL.—Throughout California the rainfall for the month was greatly in excess of the usual amount, the greatest excess being found along the coast of Central California, and the least in the lower San Joaquin Valley. In Oregon and Washington Territory, the rainfall has been light, the greatest departures from the normal amount occurring near the Columbia River.

APRIL, 1889.

Reports received from seventy-two different localities, with an estimated population of seven hundred and one thousand nine hundred and fifty, give a mortality of eight hundred and thirty-five, which is a percentage of 1.18 per thousand in the month, or an annual mortality of 14.16, which is the lowest annual percentage at which we have yet arrived, indicating a remarkably good condition of the public health throughout the State.

CONSUMPTION, as usual, heads the list of decedents with one hundred and thirty-eight, which, however, is a decrease from the number reported last month.

PNEUMONIA shows how rapidly its frequency is abating by recording only forty-five deaths in April, as against seventy-six in March. This rapid decrease in fatality is in a great measure due to the favorable weather during the month, which was warm and pleasant, without any extremes of temperature.

BRONCHITIS caused twenty-one deaths, the majority occurring in the very young or the very old.

CONGESTION OF THE LUNGS is reported as having caused seven deaths.

DIARRHŒA AND DYSENTERY, although increasing very much in frequency, are not increasing in fatality in the same ratio, eight deaths only being attributed to them. Of these, four occurred in one town from dysentery.

CHOLERA INFANTUM again claims attention by its death rate, fifteen deaths being ascribed to it during the month.

DIPHTHERIA was fatal in nineteen instances, which is a decrease from last report. Eight of these occurred in San Francisco, five in Oakland, and one each in Colfax, Grass Valley, Vallejo, Pasadena, Los Gatos, and Santa Barbara.

CROUP is credited with six deaths, three in San Francisco, two in Los Angeles, and one in Nevada City.

WHOOPIING-COUGH is credited with six deaths.

SCARLET FEVER caused four deaths—two in San Francisco, and one each in Santa Ana and San Diego.

MEASLES was not fatal in a single instance.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER caused but two deaths.

TYPHOID FEVER was fatal in twenty-three instances, a slight increase over last month's fatality from this cause.

REMITTENT AND INTERMITTENT FEVERS are reported to have occasioned four deaths.

CEREBRO-SPINAL FEVER.—Nine deaths were reported from this disease; one in Chico, one in Ione, one in Sacramento, one in San Diego, two in San Francisco, and three in San Bernardino.

CANCER caused thirty-two deaths, a slight excess over the usual mortality.

ERYSIPELAS was fatal in four cases.

HEART DISEASE caused seventy-one deaths.

ALCOHOLISM was fatal in one instance.

The following towns report *no deaths* during the month: Alturas, College City, Cottonwood, Etna Mills, Gonzales, Igo, Lincoln, Lower Lake, Roseville, North Bloomfield, Redding, Sisson, Shasta, Wheatland, and Downieville.

PREVAILING DISEASES.

Reports of sickness received from eighty different localities indicate a minimum amount of disease in the various towns heard from, many of the towns reporting no sickness whatever. These intimations of an absence of any prevailing disease at this season of the year is gratifying to the sanitarian as an indication of the progress that sanitary science is making in the State; we believe that it is rapidly becoming a settled conviction in the public mind that without cleanly homes and surroundings good health cannot be maintained. With the advent of the new law compelling the organization of a Board of Health or the appointment of a Health Officer in every town of five hundred or more inhabitants, we expect a sanitary movement throughout the State that will not permit any town to abide in filth, and take its chances of Providence averting an epidemic that its own unsanitary condition has invited. Through these officers we hope to find many diseases entirely prevented from passing beyond their original place of development, and no disease allowed to attain to any epidemic proportions if sanitation can prevent it.

PNEUMONIA.—The warm weather experienced during the month of April seems to have had a salutary influence in diminishing the frequency of this disease. We find it noted in reports from Oakdale, Gridley, Downey, Merced, Lockeford, Hollister, Truckee, Red Bluff, College City, Fresno, Newman, Santa Barbara, Napa, Oakland, Chico, and San Francisco.

BRONCHITIS in a mild form was also noticed in Oakdale, Sisson, Downey, Lockeford, Dixon, Cottonwood, Brownsville, College City, Etna Mills, Fresno, Bakersfield, Stockton, Oakland, San Francisco, and Sacramento.

WHOOPIING-COUGH was prevalent in Knights Ferry, Lodi, Ione, Oakdale, Placerville, Sacramento, Newman, Auburn, Fresno, San Francisco, and Santa Barbara.

CHOLERA INFANTUM is mentioned as appearing during the month in Lodi, Fresno, Grass Valley, Hanford, Oakland, San Diego, San Francisco, Santa Ana, and Santa Barbara. The cases were not numerous.

SCARLET FEVER, in quite a severe form, was noticed in Hanford. It was also present in San Francisco, Fresno, Elk Grove, San Diego, and Santa Ana.

DIARRHŒA AND DYSENTERY are again occupying a place among the "prevailing diseases," and were present in Sacramento, Oakland, San Francisco, Colton, Knights Ferry, Oakdale, Downey, Igo, Merced, Red Bluff, College City, Fresno, Hanford, and Alameda.

SMALLPOX.—There was one case of smallpox in San Francisco and one case in Hanford developed during the month. Both are now convalescent. In Hanford no new cases have appeared, and quarantine has been raised. Dr. Davidson thinks that they will have no further trouble with it.

MEASLES appeared in Sisson, Cottonwood, Merced, Etna Mills, Lodi, Fresno, and Benicia. The type is very mild, and the extent of the disease limited.

DIPHTHERIA was noted in many places during the month. In San Francisco twenty-five cases were reported, which is about the same as last month. Sporadic cases also appeared in Sisson, College City, Fresno, Colfax, Grass Valley, Oakland, Vallejo, and Santa Barbara.

PAROTIDITIS, OR MUMPS, was present in Sacramento and Fresno in a limited number of cases.

ERYSIPELAS was reported in Gridley, Oakdale, Downey, College City, Fresno, Sacramento, Colfax, Lodi, Brownsville, and San Francisco. The type was exceedingly mild, and the fatality extremely limited.

TYPHOID FEVER is not prevailing, according to reports received. A case or two was noted in Red Bluff, St. Helena, Etna Mills, Fresno, Lodi, Bakersfield, Oakland, Pomona, Stockton, Sacramento, and San Francisco.

MALARIAL FEVERS are noticed in our reports with increasing frequency as the warm weather approaches. To the present time they offer no evidence of malignancy, the mortality being exceedingly limited. Many of these cases of fever can be prevented by a little attention to the surroundings of our dwellings; in seeing that no garbage or decomposing vegetable matter be allowed to decay in the cellar or outhouses; that the sewers are kept clear, to allow all the surface water to be freely drained from our doors; by having cellars and outhouses thoroughly cleaned and whitewashed; and by being a little particular as to the source of water supply.

PACIFIC COAST WEATHER.

The month has been marked by the absence of storms accompanied by dangerous winds. Copious showers have fallen during the month in Oregon, Washington Territory, and Northern California, and light showers in Central California. The temperature has been much higher than usual in all districts.

MAY, 1889.

Reports received from seventy-eight towns, with an estimated population of seven hundred and twenty-five thousand four hundred and fifty, give a total mortality of eight hundred and eighty-five, which is a percentage of 1.22 per thousand in the month, or an annual mortality of 14.61, which is an indication of the continued absence of any serious or epidemic disease within the State.

CONSUMPTION is credited with one hundred and forty-six deaths, or 16½ per cent of the total mortality.

PNEUMONIA.—The total deaths from this disease were fifty-two, a very slight increase over the death record of the preceding month.

BRONCHITIS caused eleven deaths only, which indicates a general abatement of the severity of the disease.

CONGESTION OF THE LUNGS was fatal in ten instances.

DIARRHŒA AND DYSENTERY show their frequency and severity by causing thirty-three deaths in May, against eight deaths in April.

CHOLERA INFANTUM is likewise increasing in frequency, twenty deaths being ascribed to it during the month.

DIPHTHERIA was fatal in twenty-four instances. Of these, only six occurred in San Francisco, seven in Los Angeles, four in Oakland, three in Healdsburg, and one each in Benicia, Downey, Grass Valley, and Gonzales.

CROUP.—Eight deaths are ascribed to this disease—three in San Francisco, two in Santa Barbara, one each in Los Angeles, Oakland, and Benicia.

WHOOPIING-COUGH being very prevalent caused eleven deaths, which is nearly double the fatality of the preceding month.

SCARLET FEVER is reported as causing five deaths—one each in Antioch, Chico, Los Angeles, San Francisco, and Oakland.

MEASLES, although prevailing extensively, was fatal in but two instances.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER caused but two deaths.

TYPHOID FEVER is credited with twenty deaths, which is a slight decrease from former report.

REMITTENT AND INTERMITTENT FEVERS caused four deaths.

CEREBRO-SPINAL FEVER is reported as causing twelve deaths. Of these, two occurred in San Francisco, and one each in Sacramento, Sisson, Santa Cruz, San Bernardino, Ione, Mendocino, Anderson, Downey, Oakland, and Hanford.

CANCER caused twenty-five deaths.

ERYSIPELAS was fatal in three instances.

HEART DISEASE caused eighty deaths.

ALCOHOLISM was fatal in two instances.

The towns reporting no deaths were Alturas, Calico, Colfax, Elsinore, Elk Grove, Fort Bidwell, Livermore, Lincoln, Monterey, Needles, Soquel, Truckee, Wheatland, and Williams.

PREVAILING DISEASES.

Reports received from eighty different localities give evidence that the excess of humidity that prevailed during the earlier part of the past month, and the increased temperature during the latter half, had the effect of developing malarial and other fevers in quite a large number of localities that, up to this time, had been completely free from them. The increased moisture and subsequent heat had, no doubt, its influence in causing the general tendency that was evinced to choleraic attacks which prevailed extensively during the month. Inflammatory diseases of the respiratory organs were much reduced in frequency and fatality.

PNEUMONIA, in sporadic form, was noticed in reports from Downey, Redding, Lockeford, Truckee, Calico, Hollister, Shasta, Oakdale, Monterey, Cloverdale, Lakeport, Red Bluff, Downieville, Fresno, Napa, Grass Valley, Chico, Forest Hill, Oakland, Pasadena, Santa Barbara and San Francisco.

BRONCHITIS, in a mild form, is mentioned in reports from Lockeford, Downey, Lemoore, Anderson, Lakeport, Monterey, College City, Elsinore, Oakdale, Ione, Hollister, Igo, Redding, Cottonwood, Williams, Fresno, and San Francisco.

WHOOPIING-COUGH has extended its area considerably during the month. It is reported in Lockeford, Knights Ferry, Mariposa, Williams, Lodi, Lemoore, Angels Camp, Oakdale, Elsinore, Hollister, Santa Cruz, Merced, Fresno, Woodland, Oakland, and San Francisco. It has been remarked that the disease seems to progress hand in hand with measles, and is apparently influenced by the temperature, increasing with a falling and diminishing with a rising temperature. As the disease is highly infectious, children suffering from it should not be allowed into schools, or crowded assemblies, or wherever other children are congregated.

MEASLES is quite prevalent in many parts of the State, and spreading rapidly. We notice it mentioned in reports from Lockeford, College City, Downey, Williams, Lodi, Angels Camp, Oakdale, Monterey, Alturas, Etna Mills, Santa Cruz, Fresno, San Francisco, and Oakland. The evidence grows stronger every day that measles, like scarlet fever, is the result of a specific germ, and consequently is preventable. It is, however, so intensely contagious that the difficulty of doing this is proportionately great. The unfortunate results that so often follow measles justifies us in recommending the placing of unprotected persons beyond its influence. The sick should be isolated, and none but

attendants allowed to enter the room. All soiled linen should be soaked in disinfectant solutions and boiled separately. The body of the patient should be anointed daily to restrain the dissemination of the contagion as much as possible. After the desquamation of the skin has taken place, a warm bath should be administered, which will probably remove any remaining contagious principle. Children with measles should not be allowed out of doors or permitted to mingle with healthy children until quite recovered.

SCARLET FEVER, although mentioned in reports from Sacramento, Redding, Calico, Los Angeles, Salinas, San Francisco, Elk Grove, Antioch, Jackson, Fresno, Chico, and Oakland, does not seem to assume an epidemic character or any malignancy. This fact, however, should not lessen the vigilance of the Health Officers to prevent its spread, as some of the most malignant and fatal epidemics have arisen from the mildest cases. In Antioch, where the disease was quite prevalent, Dr. F. Rattan assures us it has ceased. Dr. Rattan has been appointed Health Officer.

DIPHTHERIA AND CROUP were noticed during the month in Downey, Igo, Anderson, Truckee, Los Angeles, Monterey, Salinas, Benicia, Elk Grove, Colfax, Gold Run, Grass Valley, Healdsburg, Oakland, San Francisco, and Santa Barbara. In Gold Run the disease has been particularly severe, twenty-one cases having occurred within the past four months. Dr. Miner writes that the sanitary condition of the place is not good. The reservoirs and ditches are filled with decaying vegetable and organic matter, and the wells, sunk below these ditches, are contaminated by seepage water. There is no local Board of Health, and, consequently, no effort made to improve the sanitary condition of the place or disinfect the contaminated dwellings. Until Boards of Health are organized or efficient Health Officers appointed in every town, we must expect this needless sickness and sacrifice of life to continue.

SMALLPOX.—Three cases of smallpox appeared in San Francisco, one case in Lodi, and one case in Stockton, during the month of May. All are now convalescing, without any new cases being reported.

ERYSIPELAS was noticed in reports from Etna Mills, Hollister, Lincoln, Shasta, Oakdale, Fresno, Truckee, Elk Grove, Lemoore, Anaheim, Grass Valley, Riverside, and San Francisco. These cases were all sporadic, due to local causes.

TYPHOID FEVER is mentioned by very few observers. Sporadic cases appeared in Los Angeles, Etna Mills, Salinas, Santa Cruz, Hollister, Mendocino, Sacramento, Santa Barbara, Selma, Watsonville, and San Francisco.

TYPHO-MALARIAL FEVER was more prevalent than typhoid, being noticed in College City, Oakland, Downey, Cottonwood, Lemoore, Fresno, Igo, Anderson, Ione, Oakdale, Merced, Anaheim, Needles, and other places. The fatality was very limited.

REMITTENT FEVER prevailed to some extent in Hanford, Grass Valley, Marysville, Sacramento, Lockeford, Knights Ferry, Cottonwood, Redding, Lemoore, Anderson, Angels Camp, Ione, Cloverdale, and Needles.

CEREBRAL FEVER was observed in a sporadic form in Fresno, Jolon, Downey, Anderson, Ione, Hanford, Mendocino, Oakland, Sacramento, San Bernardino, San Francisco, Santa Cruz, and Sisson.

CHOLERA INFANTUM is mentioned in our reports from Knights Ferry, Ione, Gridley, Merced, Fresno, Anderson, Anaheim, Chico, Grass Valley, Nevada City, Red Bluff, San Francisco, Oakland, and San Bernardino.

DIARRHEA AND DYSENTERY are quite prevalent in Sacramento, San Francisco, Oakland, Downey, Mariposa, Williams, Lodi, Redding, Oakdale, Lockeford, College City, Anderson, Lemoore, Monterey, Los Angeles, Angels Camp, Cloverdale, Salinas, Shasta, Placerville, Hollister, Fresno, Gridley, Truckee, Red Bluff, Soquel, Needles, Riverside, San Diego, Selma, Hanford, Dixon, and San Francisco.

DYSENTERY was reported as epidemic in Fresno, but inquiry of the Health Officer, Dr. T. M. Hayden, elicits the fact that such was not the case. Some sporadic cases were observed as prevailing, but nothing more. In Hanford it was also reported as epidemic, but careful inquiry through Dr. John A. Davidson, Health Officer, resulted in ascertaining that among children a very severe form of miasmatic colitis prevailed, complicated in many cases by cerebral congestion, which was generally fatal. Through the kindness of Dr. W. H. Miller, of Hanford, this Board has received a very graphic description of the disease, together with the results of a post mortem examination, which indicated a very severe form of inflammatory disorder of the bowels, extending, in the case narrated, to the brain. This severe and fatal form of attack seems confined to children, no deaths among adults being observed. The opinion is daily gaining credence that the excretions in dysenteric attacks should be immediately disinfected and buried, as it is generally believed that the disease depends upon a living germ taken into the stomach, either with the food or through the impurity of the water imbibed. Indeed, so many diseases can be produced from impure water, that for prudential reasons, all water should be boiled before being used for drinking purposes, especially during the summer months.

PACIFIC COAST WEATHER.

WEATHER.—The first half of the month was marked by cool weather and frequent rains. During the latter half of the month the temperature was high and the weather fair, except in Oregon and Washington Territory, where light rains occurred at intervals. The heavy rains of the first part of the month were, on the whole, beneficial to growing crops, though causing damage in some localities.

RAINFALL.—The rainfall during the month was in excess of the normal rainfall for May in all districts, markedly so, except in the vicinity of Puget Sound and in the San Joaquin

Valley, where the departures from the normal were small. The rainfall for the season to June first is decidedly below the normal in Oregon, Washington Territory, and Nevada, and slightly below it in the San Joaquin Valley. In other districts the seasonal rainfall is slightly in excess of the normal.

JUNE, 1889.

Reports received from eighty towns, with an estimated population of seven hundred and twenty-eight thousand seven hundred, give a total mortality of eight hundred and fifty-four, which is a percentage of 1.17 per thousand in the month, or an annual mortality of 14.04, which is an exceptionally small death rate, and indicates how little serious sickness was present within the State during the month of June.

CONSUMPTION is credited with one hundred and thirty-nine deaths, which is less than the usual monthly mortality.

PNEUMONIA.—The number of decedents from this disease decreased to thirty-five, or 20 per cent from the previous month.

BRONCHITIS caused eighteen deaths, which is a slight increase.

CONGESTION OF THE LUNGS is credited with sixteen deaths, the greater number occurring in young children.

DIARRHEA AND DYSENTERY were the cause of twenty-three deaths, which, while a decrease from last report, indicates a great frequency of these diseases.

CHOLERA INFANTUM was fatal in twenty-two instances, which also shows increasing frequency of the disease.

DIPHTHERIA was fatal in twenty-six instances. Of these, San Francisco had only four, Los Angeles eight, Oakland six, and one each in Santa Cruz, Santa Monica, Santa Ana, San Bernardino, Petaluma, Modesto, Colton, and Calico.

CROUP was fatal in six instances—three in San Francisco, two in Los Angeles, and one in Oakland.

WHOOPING-COUGH, although quite prevalent, and in some places epidemic, only records three deaths as a result of the disease, which indicates an unusual mildness of its type.

SCARLET FEVER caused five deaths—one in San Francisco, one in Selma, one in Tulare City, and two in Riverside.

MEASLES was fatal in but two instances—one in San Francisco and one in Williams.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER, although reported as prevailing, caused one death in San Francisco.

TYPHOID FEVER is credited with thirty-one deaths, which is an increase of ten over last report. Nine of these deaths occurred in San Francisco, six in Los Angeles, three in San Diego, two in Santa Monica, two in Riverside, two in Sacramento, and one each in Wheatland, Selma, Mendocino, St. Helena, Calico, Etna Mills, and Alameda.

REMITTENT AND INTERMITTENT FEVERS caused one death in Marysville.

CEREBRO-SPINAL FEVER is credited with causing six deaths—three of these in San Francisco, and one each in Sacramento, Anderson, and Anaheim.

ERYSIPELAS was fatal in four instances.

CANCER caused forty-two deaths, which is an increase of seventeen over last report.

HEART DISEASE is credited with fifty-one deaths.

ALCOHOLISM was fatal in six instances.

THERMIC FEVER, or Heat Apoplexy, is credited with causing two deaths in Stockton. The particulars of these cases were not received. No other death from this cause is reported within the State.

PREVAILING DISEASES.

Reports of sickness received from ninety-four localities throughout the State indicate that a minimum amount of disease prevailed during the month of June. Although the reports of the Signal Service declare that the mean temperature of the month was above the average, its effects were not manifested by any great increase in the number of cases of bowel disorders reported. It is, however, very doubtful if an increase of temperature has, of itself, that marked effect upon intestinal derangements that is so popularly ascribed to it. The state of the weather in its relation to health is, in a great measure, governed by the local conditions surrounding us. If they are bad, and need only an increase of heat to develop those poisonous emanations which are hidden under a lower temperature in all decaying and decomposing animal and vegetable matter, then will sickness increase, bowel disorders flourish, and the warm weather be unjustly blamed for what our own foresight should have prevented. If, before the warm days and nights come upon us, we would see that our cities, towns, villages, and dwellings were properly cleaned and divested of all possible sources of corruption—that our drinking water was pure and our air untainted by human filth, then even extremes of temperature would have very little effect in engendering disease or shortening our lives.

CHOLERA INFANTUM.—We find this disease was noticed in Redding, Biggs, Knights Ferry, Lodi, Ione, Anderson, Antioch, Grass Valley, Fresno, Pomona, Woodland, Sacramento, San Diego, San Bernardino, and San Francisco. The disease was in a sporadic form, and could be traced in most instances to errors in diet. In one case, in which death occurred in less than fifteen hours, it was undoubtedly due to tyrotoxicon developed in milk while standing in an unsanitary cellar for six hours. We have no doubt that many infantile deaths are caused in this way, which are wholly preventable by care and the exercise of common sense.

DIARRHŒA AND DYSENTERY were reported as quite prevalent in a large number of localities. They were noticed in Sacramento, Brownsville, Williams, Truckee, Biggs, Angels Camp, Redding, Anderson, Lakeport, College City, Lemoore, Knights Ferry, Lodi, Colton, Ione, Selma, Traver, Needles, Calico, Chico, Hollister, Los Angeles, Oakdale, Santa Barbara, San Diego, Truckee, Tulare City, Etna Mills, Forest Hill, Red Bluff, Colfax, Shasta, El Monte, Downey, and Fresno.

SMALLPOX was not reported from any town in the State. *Varicella*, or chickenpox, was noticed in Los Angeles, Mariposa, Sacramento, and a few other towns, in sporadic form. Dr. A. C. Keating, in San Bernardino, reports smallpox as raging in Albuquerque, New Mexico. This is getting the disease quite close to our southern border, and will probably need an Inspector on the line, if the report is confirmed.

MEASLES, of an exceedingly mild type, was noticed in Santa Cruz, Williams, Traver, Angels Camp, Lodi, Hollister, San Francisco, College City, Downey, Etna Mills, and Red Bluff.

SCARLET FEVER was noticed in a few instances in San Francisco, Selma, Pomona, Riverside, Ione, Calico, Los Angeles, Tulare City, Anderson, and Oakland. The type of the disease continues to be mild, and its tendency to spread very limited.

DIPHTHERIA AND CROUP continue to be mentioned in our reports; last month they were noticed in San Francisco, Los Angeles, Oakland, Santa Cruz, Truckee, Williams, Soledad, Colton, Igo, San Bernardino, Modesto, Petaluma, Santa Monica, Santa Ana, and Calico. The prevention of the spread of these diseases is an object which should engage the attention of Health Boards and Health Officers throughout the State. Without the greatest vigilance on their part the disease will continue to enlarge our mortality lists, and cast reflection upon our sanitary progress. Nurses and physicians attending diphtheritic patients should avoid, as far as possible, the infection of their persons and clothing—several cases having been recorded of the conveyance of the poison by those parties, they themselves remaining well. Where diphtheria is prevalent parents should daily inspect the throats of their children before sending them to school, and if any sign of inflammation appears they should be kept at home, as it is these cases of so called "walking diphtheria," or mild diphtheria, that are the most common sources of propagating the disease, being allowed to mingle with other children, drink from the same cup, play with the same toys, and even kiss each other, without fear of consequences. No parent is justified in sending the children to school when the infectious disease is present in their house, no matter what its character.

WHOOPIING-COUGH was epidemic at Hollister, and quite prevalent at Dixon, Lemoore, Knights Ferry, Elsinore, Mariposa, Angels Camp, Oakland, Selma, Lodi, Los Angeles, Forest Hill, and Napa. The discovery by Professor Afanassjew that whooping-cough depended upon a specific bacillus, has brought the disease within the category of those that are preventable, or, at all events, of those that are amenable in a measure to specific treatment; hence, the relief experienced by those children exposed to the sulphurous fumes about gasworks, and the treatment by certain antiseptic drugs. In the near future, we hope science will give us complete control of this, one of the most fatal diseases of infancy.

ERYSIPELAS, in sporadic form, was observed in Antioch, Dixon, Lemoore, Brownsville, Pomona, Angels Camp, Needles, Ione City, Fresno, San Bernardino, Forest Hill, Oakland, and San Francisco.

TYPHOID FEVER prevailed to some extent in Los Angeles, San Francisco, Oakland, Alameda, Sacramento, Etna Mills, Calico, College City, Colfax, Dixon, Selma, Wheatland, Santa Monica, San Diego, Riverside, Mendocino, and Fresno.

TYPHO-MALARIAL FEVER is also noted in reports from Redding, Anderson, Anaheim, Oakdale, Williams, San Bernardino, Igo, Ione, College City, Red Bluff, and Colton.

REMITTENT AND INTERMITTENT FEVERS are mentioned in many reports as prevailing. These being essentially malarial fevers, and dependent in a great measure upon local conditions, are to be expected at this season of the year, when ponds and marshy grounds are drying up and rivers falling.

THERMIC FEVER.—Some instances of heat exhaustion have been observed during some of the warm days in the month, but no report of its prevalence has been received at this office.

PACIFIC COAST WEATHER.

But one well marked storm appeared upon the Pacific Coast in June. This was central in Washington Territory on the twenty-seventh and twenty-eighth, the accompanying rain area extending as far south as San Francisco. This storm was accompanied by high winds off the coast of Oregon and Washington Territory.

Rain fell in Oregon and Washington Territory on the 26th, 27th, 28th, and 29th, and in Northern California on the 27th. Light showers occurred in portions of Southern California on the 4th.

THE MEAN TEMPERATURE for the month was decidedly higher than usual, except along the coast of California, where the departures from the normal were small.

THE RAINFALL for the month was below the normal rainfall for June, except in Washington Territory and portions of Northern California, where it was about normal.

JULY, 1889.

Reports of mortality received from one hundred cities and towns, with an estimated population of eight hundred and three thousand five hundred and fifty, give the number of deaths as eight hundred and ninety-seven, which is a percentage of 1.11 per thousand in the month, or an annual mortality of 13.32, which is the smallest death rate yet recorded in the year. It indicates an entire absence of epidemic disease of a fatal character, and a general condition of healthfulness throughout the State, which speaks louder than words.

CONSUMPTION, which enters so largely into our mortality returns, was fatal in one hundred and twenty-nine cases, which is below the monthly average.

PNEUMONIA had a mortality of thirty-eight, of which number twenty-three occurred in San Francisco, the others in different parts of the State.

BRONCHITIS is reported to have caused nine deaths, seven of which occurred in San Francisco, one in Chico, and one in San Diego.

CONGESTION OF THE LUNGS was also fatal in nine instances.

WHOOPING-COUGH, which prevails in a great many places, caused eleven deaths, which is an increase in mortality from this disease.

CROUP was fatal in three cases, all of them occurring in Los Angeles.

DIPHTHERIA is credited with fifteen deaths, which is a decrease of eleven from last month's mortality; of these deaths only six occurred in San Francisco; four were reported from Los Angeles, and one each from El Monte, Grass Valley, Red Bluff, Healdsburg, and San José.

DIARRHŒA AND DYSENTERY were the cause of sixteen deaths, which is a decided decrease from the June report.

CHOLERA INFANTUM was fatal in twenty-three instances, which shows an increasing frequency in that disease.

SCARLET FEVER is reported as causing but one death during the month; that was in San Francisco.

MEASLES caused no deaths.

SMALLPOX.—No deaths from it were reported.

TYPHO-MALARIAL FEVER is credited with four deaths.

TYPHOID FEVER is reported to have been the cause of twenty-nine deaths, which is a slight decrease from last report. Thirteen of these deaths occurred in San Francisco, two each in Sisson, Santa Ana, Sacramento, and Placerville, and one each in Dixon, El Monte, Los Angeles, Mendocino, Nevada City, Pasadena, San Diego, and Watsonville.

REMITTENT AND INTERMITTENT FEVERS are credited with six deaths, which is above the usual mortality, and indicates a wide extension of these diseases.

CEREBRO-SPINAL FEVER seems to have caused thirteen deaths, which is a large increase over the report for June. Three of these occurred in San Francisco, two in San José, two in Lodi, and one each in Sacramento, Susanville, Eureka, Napa, Angels Camp, and Anderson.

ERYSIPELAS was fatal in but two instances.

CANCER caused twenty-one deaths.

HEART DISEASE was fatal in eighty-four instances during the month of July, which is a large increase from this cause.

ALCOHOLISM was the cause of death in nineteen cases, which is also a very large increase over the usual number that die from this preventable disease.

PREVAILING DISEASES.

Reports received from one hundred and twenty localities throughout the State indicate a remarkable absence of zymotic diseases. All observers agree that a general mildness of type characterized the sickness which had come under their notice, which will, perhaps, in a measure, account for the limited mortality recorded during the month. As might be expected, the most prevalent of all disorders of the system were those affecting the stomach and bowels, and this was particularly noticed during and after the very warm days that were experienced in the earlier and latter part of the month.

CHOLERA INFANTUM was noticed in several reports. It was present in Sacramento, Cedarville, College City, Mariposa, Lodi, Forest Hill, Fresno, Salinas, Chico, Grass Valley, Lakeport, Lemoore, Oakland, Rocklin, San Bernardino, San José, and San Francisco.

DIARRHŒA AND DYSENTERY were observed with undue frequency in Alturas, Fresno, Hollister, Williams, North Bloomfield, Shasta, Red Bluff, Anderson, Redding, Brownsville, Eureka, Lemoore, Merced, Colfax, College City, Benicia, Susanville, Lakeport, El Monte, Santa Paula, Etna Mills, Calico, Downey, Oakdale, Truckee, Los Angeles, Marysville, Oakland, and San Francisco.

SMALLPOX was not reported from any locality during the month. We have therefore come to the reasonable conclusion that the disease is now entirely absent from the State for the first time in over two years. This fact should now be taken advantage of by urging immediate vaccination of all unvaccinated persons, so that if the disease is again imported into the State it will find no pabulum upon which to feed, and will die for want of sustenance. By thorough vaccination there need not be another case of smallpox in California; it is to be hoped that the new law upon vaccination will tend toward this desirable end, and by protecting our children, lessen the chances of any severe epidemic, even if again attacked by the insidious foe.

MEASLES was observed in a few instances, in San José, Lodi, and Angels Camp. It was very mild, and without any mortality.

SCARLET FEVER is mentioned in but two reports, and they were sporadic cases.

DIPHTHERIA AND CROUP are mentioned in reports from Sacramento, Napa (imported from Howell Mountain), Anaheim, El Monte, Downey, Los Angeles, San José, Red Bluff, Truckee, Eureka, Fresno, Salinas, and San Francisco. The disease is not reported epidemic in any locality, and the type is not of a severe character, according to the advices received.

WHOOPING-COUGH was noticed in Napa, Lemoore, Mariposa, Redding, Elsinore, Susanville, San José, Dixon, Eureka, Fresno, Chico, Hollister, Los Angeles, Oakland, and San Francisco.

ERYSIPELAS in a sporadic form was observed in Truckee, Redding, North Bloomfield, Lower Lake, Long Beach, Fresno, Cedarville, Dixon, Chico, and San Francisco.

TYPHO-MALARIAL FEVER, as it is called, seems to prevail in many localities; it is noticed in reports from Anderson, Igo, Lemoore, College City, Oakdale, Anaheim, Truckee, Shasta, Los Angeles, Tulare City, and Visalia. Although the disease is frequent, the mortality is exceedingly limited.

TYPHOID FEVER, while not prevailing to any great extent, was noticed in reports from Sacramento, Redding, Anderson, Etna Mills, North Bloomfield, Chico, El Monte, Calico, Downey, San José, Alturas, Fresno, San Diego, Placerville, Los Angeles, Mendocino, Nevada City, Santa Ana, Pasadena,* Sisson, Watsonville, and San Francisco. As this is the season of the year when typhoid fever is most likely to prevail, and thereby increase the chances of the contamination of our drinking water, and as it is also at this time that visitors leave the warm valleys to seek health and recreation at the various mountain and seaside resorts, we cannot too earnestly advise such sojourners to criticise keenly the sanitary surroundings of the place in which they propose to spend their summer holiday; examine the outhouses and privies; see where the sewage is conveyed and deposited; note the proximity of the closets to the well, and if the well is a dug one, and within three hundred feet of the sewer, cesspool, or privy, do not drink the water from such well, except you know it to be boiled. In short, avoid all summer resorts where cleanliness and sanitation is not the rule, where every outhouse, privy, and cesspool is not deodorized and disinfected as regularly as the week comes round. Without this, danger is ever present, and we firmly believe that more typhoid fever is contracted in these insalubrious country houses, whose portals we seek for health, than the public is aware of. The frequent proximity of cow yards, hen roosts, stables, and even pig pens, make the surrounding atmosphere anything but salubrious. It is therefore an act of prudence to study the sanitary surroundings of a pleasure resort before incurring the exposure, and perhaps fatal danger, which sanitary conditions always present.

REMITTENT AND INTERMITTENT FEVERS were quite prevalent along the river bottoms, which is to be expected at this season of the year.

PNEUMONIA is not mentioned as frequent in any of our reports. Some cases were noticed in San Francisco, Eureka, Benicia, Anderson, Angels Camp, College City, Chico, Jackson, Los Angeles, Mariposa, Oakland, Salinas, San José, Santa Ana, and Trinity.

BRONCHITIS was also noticed in several towns along the seacoast. The type was not of a severe character, and its prevalence was limited.

CEREBRAL FEVER is mentioned in reports from Anderson, Angels Camp, College City, Fresno, Lodi, Eureka, Napa, Sacramento, San José, Susanville, and San Francisco. The appearance of cerebral fever in different sections of the State would seem to confirm the opinion of late observers that the infectious germ is preserved in the soil, and thence passed into the atmosphere, as it is now known that epidemics of this disease may appear at any season independent of local temperature; and as drying does not destroy the vitality of the disease germ, it may explain those cases of the disease which seem to spread by way of the air.

PACIFIC COAST WEATHER.

In Oregon and Washington Territory the mean temperature for the month was decidedly above the average for July. In California the temperature was lower than usual during the greater part of the month, though very warm weather during the first few and last few days brought the mean temperature for the month slightly above the normal.

Local showers fell in portions of Oregon and Washington Territory on the sixteenth, seventeenth, and twenty-third.

AUGUST, 1889.

Mortality reports received from one hundred localities throughout the State, with an estimated population of eight hundred and thirty thousand four hundred and fifteen, give the number of deaths as eight hundred and nine, which is a percentage of 0.97 per thousand in the month, or an annual mortality of 11.64, which we believe to be the lowest death rate ever recorded in this State. It indicates a degree of healthfulness throughout California which is most gratifying to the sanitarian, and gives evidence that the health organizations lately instituted under the new law are doing efficient work.

CONSUMPTION added largely to our mortality returns by one hundred and thirty-nine deaths.

PNEUMONIA had a mortality of thirty-nine. Twenty-four deaths occurred in San Francisco, four in Oakland, two in Los Angeles, two in Sacramento, and one each in Angels Camp, Chico, Eureka, Martinez, Nevada City, Petaluma, and Redding.

BRONCHITIS caused but nine deaths, seven of them in San Francisco, one in Grass Valley, and one in Los Angeles.

CONGESTION OF THE LUNGS was fatal in four instances.

WHOOPIING-COUGH is credited with ten deaths.

DIPHTHERIA AND CROUP, which may be classed together, are reported as causing twenty-six deaths; of these, five are attributed to croup. Only four deaths from diphtheria occurred in San Francisco, six in Los Angeles, three in Oakland, two in Sacramento, two in Downey, and one each in Elk Grove, Livermore, Mendocino, and Willows.

DIARRHŒA AND DYSENTERY, although quite prevalent in many localities, caused but six deaths.

CHOLERA INFANTUM likewise reports the small mortality of eleven, which is a decrease of one half from last report.

SCARLET FEVER caused one death in San Francisco, and one in Livermore.

MEASLES was fatal in one instance, in San Francisco.

TYPHO-MALARIAL FEVER is credited with one death.

TYPHOID FEVER is reported to have caused twenty-two deaths, which is remarkably small at this season of the year.

REMITTENT AND INTERMITTENT FEVERS are credited with five deaths.

CEREBRO-SPINAL FEVER caused six deaths—one each in Fort Bidwell, Mendocino, and San José, and three in Oakland. The decrease in the mortality from this disease is very gratifying.

ERYSIPELAS was fatal in but two instances.

CANCER caused seventeen deaths.

HEART DISEASE was fatal in sixty-four cases.

ALCOHOLISM was the cause of death to seven persons, which is a decrease from last report.

The following towns report no deaths during the month: Anderson, Colton, Colusa, Dixon, Downeyville, Elsinore, Galt, Gonzales, Knights Ferry, Lemoore, Lincoln, Roseville, San Mateo, and Trinity. In San Bernardino there was but one death, and that from accident.

PREVAILING DISEASES.

Reports received from one hundred and twenty localities continue to indicate that in the month of August the minimum of sickness which prevailed during July still continued. No epidemic is reported anywhere, and when we consider that this office has now established communication with almost every portion of the State, and therefore in a position to ascertain the facts, this phenomenal absence of any prevailing disease within its borders is remarkable. A report was received that smallpox was raging in Socorro, in New Mexico, but upon investigation through our efficient Health Officer, Dr. J. P. Booth, at Needles, we learned that although the disease was there, as reported, it was under control, and did not seriously menace our State. Dr. Booth may be trusted to guard against its inroad within his jurisdiction.

Although the meteorological conditions were, from an increased temperature above the normal, most favorable to the development of intestinal derangements, we find that in fact, that most frequent of all accompaniments to abnormal heat among children—

CHOLERA INFANTUM was seldom mentioned in our reports. Some sporadic cases were noticed in Sacramento, Lodi, Ione, Anderson, Downey, Lemoore, San José, Madera, Fresno, Anaheim, Chico, Grass Valley, Oakland, Redlands, and San Francisco. They were few in number, and the mortality, as may be seen, was very limited.

DIARRHŒA AND DYSENTERY were noticed with some frequency, but without epidemicity, in Sequel, Napa, Ione, Angels Camp, Anaheim, Williams, Anderson, Sausalito, El Monte, Monrovia, Shasta, Etna Mills, Chico, Lodi, Downey, Truckee, Lemoore, Susanville, Millville, North Bloomfield, Fresno, Healdsburg, Grass Valley, Nevada City, and Marysville.

SMALLPOX is not mentioned in a single report. It therefore continues to remain absent from the State.

MEASLES was noticed in a few instances in Sausalito, Dixon, Merced, and San Francisco.

SCARLET FEVER made its appearance in a limited number of cases, in Sacramento, Elk Grove, Sausalito, Livermore, Alameda, and San Francisco.

DIPHTHERIA AND CROUP, as we must class them together, were observed in Sacramento, Anderson, El Monte, Monrovia, Downey, Truckee, San José, Chico, Anaheim, Los Angeles, Livermore, Mendocino, Willows, Oakland, and San Francisco.

The instrumentality of Boards of Health in educating the public to the dangerous and contagious nature of this disease, and the necessity of strict isolation and complete disinfection of all persons and things in contact with it, has done much to limit its spread, and to their efficient action may we hope soon to be enabled to chronicle the event of its complete disappearance from our midst, as it is a disease as surely susceptible of perfect extirpation as smallpox, if as efficiently dealt with. To do this promptly there should be a law to compel a notification of its presence in every instance to the Health Officer, and the premises quarantined by a distinctive flag or printed notice. If we reflect that diphtheria is more deadly than smallpox, and more destructive in its ultimate results, it will be conceded that no measures can be too strong in guarding the public against its inroads.

ERYSIPELAS was observed in a sporadic form in San Bernardino, Sierra City, Monrovia, Williams, Chico, Truckee, Fresno, and Watsonville.

TYPHOID FEVER.—If Pectenkofer's theory be true, that the prevalence of typhoid fever is dependent in a great measure upon the height of the ground water, we ought, owing to the dryness of the season, to have had frequent mention of it in our reports; whereas,

in fact, it seems to prevail to quite a limited extent. Sporadic cases were observed in Angels Camp, Sacramento, Napa, Sierra City, Needles, Monrovia, Redlands, Newman, Downieville, Fort Bidwell, Etha Mills, Chico, Downey, Dixon, Elk Grove, San José, North Bloomfield, Rio Vista, Fresno, Placerville, San Diego, Sisson, Susanville, Watsonville, and San Francisco.

TYPHO-MALARIAL FEVER was noticed in Benicia, Ione, Anaheim, Anderson, Redding, Chico, Truckee, Fresno, Igo, Lemoore, and Merced.

REMITTENT FEVER was observed with some frequency in Ione, Angels Camp, Sacramento, Sierra City, Anderson, Redding, Fort Bidwell, Chico, Truckee, Igo, Lodi, Santa Cruz, Fresno, Millville, Folsom, Newcastle, Ophir, Loomis, and Selma.

PNEUMONIA is seldom mentioned in any of the reports. A few cases occurred in Benicia, Ione, Anderson, Downieville, Redding, Truckee, Petaluma, and Fresno. It was quite prevalent in San Francisco during the month in a sporadic form, and dependent upon local causes.

BRONCHITIS, in a mild form, was reported in San Bernardino, Williams, Needles, El Monte, Eureka, Chico, Lockeford, Fresno, and San Francisco.

WHOOPIING-COUGH is mentioned in reports from Napa, Sausalito, Monrovia, Eureka, Newman, Chico, Downey, Sacramento, Dixon, Lodi, Susanville, Santa Cruz, Millville, Lockeford, Fresno, Los Angeles, Hollister, and San Francisco.

THERMAL FEVER.—Three cases were reported as occurring in Needles, but happily without fatal results.

As the organization of local Boards of Health and the appointment of Health Officers are now being rapidly accomplished in obedience to the State law making such appointments compulsory, we would beg to remind all communities so favored that such organizations or appointments can offer no means of defense against the inroads of disease without the active coöperation of the citizens among whom they are placed. We know that the prosperity of a town depends much upon its healthfulness and the safety of life therein; it therefore becomes most important that upon the first appearance of any infectious disease its presence should be made known to the officers of health, that all necessary precautions may be taken to prevent in the first instance its spread; secondly, to discover, if possible, its cause; and, thirdly, to take measures to remove or destroy it. Typhoid fever, smallpox, scarlet fever, and kindred infectious diseases, need never extend beyond their original point of development if properly cared for under the instructions of an intelligent Health Officer. It, therefore, becomes the highest duty of a citizen to coöperate with the officers of health to save not only the community from sickness and their fellow citizens from death, but also to preserve the good name of their town for healthfulness and sanitary salubrity. "There is no doubt," says a late writer, "that the people themselves are responsible for many of the diseases which afflict them, and when the art of preserving health shall have attained to the same perfection as the means that now exist for destroying it, we may expect a large reduction in sickness and a willingness to be governed by sanitary rules that are now looked upon by a large class of people as interfering with their personal liberty."

PACIFIC COAST WEATHER.

The mean temperature for the month was slightly higher than the normal temperature for August, in all of the Pacific Coast districts, the first half of the month being marked by temperature decidedly above the normal.

Rain fell in Oregon and Washington Territory on the 17th, 18th, 23d, 26th, 27th, 30th, and 31st; at San Diego on the 16th, and in the vicinity of Los Angeles on the 31st.

SEPTEMBER, 1889.

Reports received from one hundred and six localities throughout the State, with an estimated population of seven hundred and ninety-nine thousand five hundred, give the number of deaths as eight hundred and seventy-six, which is a percentage of 1.9 per thousand in the month, or an annual mortality of 13.08, which, while a very low percentage, is much higher than that recorded in August.

CONSUMPTION is credited with one hundred and twenty-one deaths, which is a decrease from last month.

PNEUMONIA caused forty-nine deaths, which is an increase of ten over last report.

BRONCHITIS was fatal in fourteen instances, thirteen of which occurred in San Francisco.

CONGESTION OF THE LUNGS caused eight deaths.

WHOOPIING-COUGH was fatal in but one instance, although the disease was quite prevalent.

DIPHTHERIA AND CROUP, which may be classed together, caused thirty-one deaths, twelve of which were attributed to croup.

DIARRHŒA AND DYSENTERY show an increase in mortality, twenty deaths being ascribed to these causes.

CHOLERA INFANTUM also shows a marked increase in its death rate, twenty-five deaths being attributed to it.

SCARLET FEVER was fatal in but three instances.

MEASLES caused no deaths.

TYPHO-MALARIAL FEVER is credited with five deaths.

TYPHOID FEVER shows a slightly increased death rate, twenty-seven deaths being recorded as arising from this cause.

REMITTENT AND INTERMITTENT FEVERS have attributed to them six deaths.

CEREBRO-SPINAL FEVER caused eight deaths.

ERYSIPELAS was fatal in but two instances.

CANCER is credited with thirty-seven deaths during September, which is just double the number recorded the previous month from this disease.

ALCOHOLISM caused the death of seven persons.

The following towns report no deaths in September: Brownsville, College City, Dixon, El Monte, Gonzales, Igo, Knights Ferry, Lockeford, Lower Lake, Lodi, Martinez, Monrovia, Modesto, Needles, Oakdale, Orland, Ontario, Sierra City, Santa Maria, Santa Paula, Trinity County, Visalia, and Williams.

PREVAILING DISEASES.

Reports received from one hundred and twenty-eight localities throughout the State continue to indicate an exceptionally favorable condition of the public health, many of our correspondents reporting no sickness whatever in their localities. Dr. H. L. Nichols, the efficient Health Officer of Sacramento, remarks "that the death rate for September in Sacramento was lower than for many years, and if we exclude the accidental and violent deaths, it is wonderfully low. There were but two deaths from zymotic causes, as against nine in September, 1888." Among the reports of Health Officers in other parts of the State we find many expressing surprise at the immunity from sickness, which, as a rule, is generally prevalent at this season of the year. A great deal of it may be ascribed to their diligence in having their towns made clean, and no breeding places for disease allowed to exist without abatement.

Although the temperature during September was high, it was not accompanied by any marked increase in intestinal disorders.

CHOLERA INFANTUM was noticed in some of our reports as present in a few instances. Its frequency is diminishing, and will, we hope, very soon be omitted entirely from our list of prevailing diseases.

DIARRHEA AND DYSENTERY continue to be the most frequently observed disorders during the month. They were noticed as present in Williams, Angels Camp, Merced, Antioch, Susanville, Biggs, Chico, Brownsville, Lemoore, Sausalito, Alturas, Redding, Santa Paula, Needles, El Monte, Knights Ferry, Oakdale, Anaheim, Lodi, Shasta, Fresno, San Pedro, Calico, Salinas, Denman, Selma, Truckee, and Los Angeles.

SMALLPOX is absent from the State.

MEASLES is reported in Antioch and Dixon.

SCARLET FEVER.—A few cases of this disease were observed in Sacramento, Gonzales, Redlands, Antioch, San José, Salinas, Livermore, and San Francisco. The type is very mild.

DIPHTHERIA AND CROUP have been noticed in sporadic form in Sacramento, San José, San Francisco, Downey, El Monte, Fresno, Calico, Salinas, Grass Valley, Los Angeles, Santa Rosa, Orangevale, and Healdsburg.

ERYSIPELAS, also in sporadic form, was reported in Monrovia, Susanville, Brownsville, Chico, Cottonwood, Truckee, Downey, Needles, Fresno, Calico, and Anaheim.

TYPHOID FEVER is noticed with increasing frequency in our reports, as might be expected from the extreme lowness of the water in the watercourses. This increasing prevalence of typhoid fever should put us upon our guard relative to the water we drink, and especially to the sources from which it is derived, as it is acknowledged by all those physicians who have carefully investigated the sources from which the disease is communicated, that in ninety-nine cases out of a hundred the chief distributor of the infection is water. It can, however, be communicated by air, the clothing of the sick, and by the hands of the attendants, if precautions are not taken to observe the utmost cleanliness. The possibility of infection by drinking water should render it the care of a paternal government to supply the people with a pure water free from pollution of any kind. At present an attempt is being made to turn the sewage of some large towns into one of the chief rivers of the State. If this is permitted, the result cannot be otherwise than an increase of sickness wherever this river water is used for domestic purposes. The excreta of one typhoid fever patient poisoned the whole water supply of a town in Pennsylvania, caused the sickness of over eleven hundred persons, and the death of four hundred and fourteen. If the diffusion of the excreta of one person carried into river water used for domestic consumption was followed by such dire consequences and fatal results, what may we expect when the sewage of many towns is conveyed into our rivers to pollute their waters and poison the consumers. That the purity of our drinking water has a marked influence in lessening the prevalence of typhoid fever may be instanced by the city of Vienna. In 1854 to 1874 that city was supplied by well water, and water pumped from the river Danube. The deaths annually from typhoid fever in these years averaged three hundred and forty in each one hundred thousand people. In 1874, a supply of spring water was introduced, and the deaths immediately fell off to fifty in one hundred thousand. As the well and river water continued to be abandoned and the supply of water entirely obtained from the springs, the deaths from typhoid fever have fallen to eleven in each one hundred thousand. Can we ask anything more convincing than these statistics to impress us with the necessity that exists of preserving the purity of our water supplies, and keeping them free from sewage contamination? The question of how we are to dispose of our sewage is one that must engage the attention of our legislators before very long. Self-preser-

vation will compel attention to it, as daily our soil is becoming more and more saturated with excremental matters, and it is only a question of a very short time when the ground air will be charged with virulent poisons, and the ground water surcharged with living messengers of death, so that we will be forced into the preservation of our water supplies from contamination, if we desire to preserve our health and our lives.

TYPHO-MALARIAL FEVER is mentioned as occurring in Livermore, Chico, Cottonwood, Truckee, Igo, Knights Ferry, Oroville, and Sacramento.

PNEUMONIA was rather more prevalent during the past month than in August. In Truckee it was of severe type. It is also mentioned in reports from Chico, Sausalito, Sacramento, Oakdale, Fresno, Salinas, Los Angeles, Oakland, Wheatland, San Diego, and San Francisco.

BRONCHITIS was observed quite frequently in San Mateo, Chico, Livermore, Alturas, Lincoln, Santa Cruz, Fresno, Salinas, San Pedro, Lockeford, and San Francisco.

INFLUENZA is noticed as prevailing in many parts of the State, especially on the coast. The type is not severe.

CONSUMPTION.—We have noticed with some apprehension the frequency with which consumption is mentioned in our reports, which might convey an erroneous impression that the disease was increasing in the State among the rising generation. That this, in a limited sense, is true, cannot be denied, but is capable of satisfactory explanation when we take into consideration the fact that for some time past California has been extensively advertised in the Northern and Eastern States as the sanitarium of the world; its luscious fruits and semi-tropical verdure have been exhibited, and its "glorious climate" so dilated upon, that a perfect exodus of diseased humanity has been precipitated upon us. Thus we find sufferers from tuberculosis in all its stages lounging in our hotel corridors, crowding our health resorts, filling our churches and assemblies, and scattering the seeds of death with every mouthful of saliva they expectorate so promiscuously whenever they are gathered together. To this influx of immigrants with diseased lungs may we attribute the apparent increase of consumption in this State. The expositions upon our "glorious climate" throughout the East, has sent us an undesirable element in the population of any country. There is no longer any doubt of the contagiousness of consumption, or of the fallacy that cure resides in climate. The climate of many parts of California will no doubt prolong the life of many consumptives, and, perhaps, arrest the disease in a few, but until we can afford to build sanitariums for the isolation of this class of patients, or erect hotels and devise pleasure resorts for their exclusive use, our State is better off without these immigrants. They disseminate a disease which practically might be unknown under proper sanitary laws, increase our mortality returns, and lessen that high standard of health to which the State is capable of attaining, from its unsurpassed climate, its geological formation, and its possibilities of presenting a temperature suitable to the climatic wants of any constitution, or which the system may demand for the better preservation of its perfect health.

PACIFIC COAST WEATHER.

The month has been marked by high temperatures and light rainfall in all Pacific Coast districts. With the exception of light rains in the southern portion, and on the extreme northern coast, there has been an entire absence of rainfall in California.

In Oregon and Washington the usual September rains occurred, but the monthly rainfall was less than usual.

OCTOBER, 1889.

Reports received from one hundred and one localities, with an estimated population of eight hundred and forty-six thousand three hundred, give the number of deaths as one thousand and seven, which is a percentage of 1.2 per thousand in the month, or an annual mortality of 14.4, which is a slight increase over the preceding two months, but sufficiently low to indicate a very favorable condition of the public health.

CONSUMPTION, as usual, heads the list with one hundred and forty-seven deaths, nearly one seventh of the total mortality.

PNEUMONIA caused fifty-four deaths, which is about the average of the preceding month.

BRONCHITIS is credited with nineteen deaths, sixteen of which occurred in San Francisco, two in Alameda, and one in Oroville.

CONGESTION OF THE LUNGS caused nine deaths.

WHOOPING-COUGH was fatal in four instances—one case each in Napa and Nevada City, and two in San Francisco.

DIPHTHERIA AND CROUP, collectively, caused thirty-five deaths. Of these, ten were reported as membranous croup. San Francisco reported ten deaths from these causes, Los Angeles six, Nevada City four, Santa Ana three, Oakland four, and Santa Barbara, San Bernardino, Pasadena, Napa, Healdsburg, Elk Grove, Fresno, and Downey one each.

DIARRHŒA AND DYSENTERY do not indicate any increase of mortality; twenty deaths only were ascribed to them.

CHOLERA INFANTUM shows a further increase of mortality during the month, no less than thirty-three deaths being credited to it. The weather during a part of the month being exceedingly wet, with an unusually high temperature, it may have been a factor in increasing the frequency of the disease and determining its fatality. However, the mortality is unusually high for October.

SCARLET FEVER caused four deaths—three of them in San Francisco and one in Alameda.

MEASLES caused no deaths.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER was fatal in four instances.

TYPHOID FEVER was fatal in forty-eight instances, which is a notable increase over the mortality for September, and indicates the extension of the disease over a large area of country.

REMITTENT AND INTERMITTENT FEVERS have attributed to them seven deaths.

CEREBRO-SPINAL FEVER caused seven deaths.

CANCER is credited with forty-eight deaths during the month.

HEART DISEASE caused seventy deaths.

ALCOHOLISM was the cause of nine deaths.

PREVAILING DISEASES.

Reports received from one hundred and seven localities throughout the State, indicate an absence of any epidemic disease. They show, however, that intestinal disorders prevail to a considerable extent, and a marked increase of respiratory affections is apparent in the counties bordering on the coast, and in the higher altitudes.

CHOLERA INFANTUM is still mentioned in our reports from San Francisco, Lemoore, Marysville, Knights Ferry, Dixon, Salinas, Chico, Long Beach, Santa Maria, Petaluma, Rio Vista, Rocklin, Sacramento, Benicia, Oakland, San José, Fresno, San Diego, Pleasanton, and St. Helena. The cases were all sporadic, and limited in number.

DIARRHŒA AND DYSENTERY were noted as frequently observed in Calico, Susanville, Chico, Lodi, Lemoore, Lincoln, Redlands, Lockeford, Los Angeles, Sausalito, San Francisco, Salinas, El Monte, Oakdale, Anderson, Jackson, Placerville, Fresno, Jolon, Oakland, Shasta, Benicia, and Bakersfield. The type of these diseases was of a mild character without any tendency to epidemicity.

SMALLPOX.—Dr. R. W. Baum, of Placerville, reports that he was called to see two patients in a family about seven miles from Placerville, and discovered that they had varioloid. The disease was supposed to have been primarily carried from Carson Valley, but in so mild a form that the parties did not deem the advice of a physician necessary. They, however, returned home with the eruption upon them, and fourteen days afterward the patients to whom Dr. Baum was called developed the disease. Fortunately they lived off from the public road, and Dr. Baum has taken so much precaution to have them properly isolated and quarantined that an extension of the disease beyond its present limits is very unlikely. No other cases were reported within the State during the month.

MEASLES in a limited number of cases was reported in Fresno and Chico.

SCARLET FEVER was quite prevalent in San Francisco; it was also reported in Alameda, Oakland, Salinas, Merced, Antioch, Rocklin, and Sacramento. In Alameda, the Health Officer, Dr. J. T. McLean, believes the disease to have been spread by the carelessness of parents in permitting children having the disease in a mild form to attend school, no physician being called in these cases, and consequently not reported to the Health Officer, as they should be. In Alameda, the Board of Health has very properly passed an ordinance requiring a placard, three by six inches, to be placed conspicuously on every dwelling containing any case of scarlet fever, diphtheria, or smallpox, making it a penal offense to remove such notice until all danger of infection had ceased. This precaution is eminently proper, and should be adopted by every Health Board and Health Officer in the State. Such notification of disease would save many lives, and be an efficient means of arresting the spread of these disorders where otherwise they might become epidemic.

DIPHTHERIA AND CROUP are noticed as having occurred during the month in reports from Truckee, Eureka, Los Angeles, San Francisco, Oakland, Elk Grove, Sacramento, Santa Ana, Downey, Nevada City, Soledad, Mariposa, San Bernardino, Healdsburg, Napa, Santa Barbara, Fresno, and College City.

As the evidence increases of the local character of diphtheria in its inception, and the great probability of the destruction of the infecting material by germicidal remedies immediately applied, the urgent necessity of calling in a medical man in every instance of sore throat, to determine its character, is apparent, the arrest of the disease being dependent upon the early recognition of its character. If delay is permitted and time given for the poisonous deposit to be absorbed into the blood, systemic infection takes place, all the deleterious effects of the disease are centered, and its power of multiplication correspondingly increased. Early recognition is the first step towards stamping out diphtheria.

WHOOPING-COUGH is mentioned in our reports from Lemoore, Napa, Eureka, San Francisco, Sausalito, Fresno, Merced, Hollister, Nevada City, and Mariposa. In the latter city it is quite prevalent, but of a mild type.

ERYSIPELAS, in a sporadic form, was noticed in Chico, Truckee, Eureka, San Francisco, Santa Ana, Sausalito, Angels Camp, Fresno, Anaheim, St. Helena, and Hollister.

TYPHOID FEVER was noticed in a great many places. In Los Angeles very many cases occurred in the orphan asylum, which may be attributed to defective sewerage, or other local causes. This disease was also noted in Brownsville, Santa Paula, Knights Ferry, Chico, Lodi, Truckee, Rocklin, Napa, Sacramento, Etna Mills, Santa Barbara, San Francisco, Dixon, Ontario, Angels Camp, Pleasanton, Fresno, Anaheim, Merced, Traver,

Antioch, San Juan, and Oakland. Its range is quite extensive, but the cases all seem sporadic, without any epidemic tendency.

TYPHO-MALARIAL FEVER was noticed in reports from Santa Cruz, Igo, Truckee, Oakdale, Anderson, Shasta, Red Bluff, and Cottonwood.

REMITTENT AND INTERMITTENT FEVERS are lessening in frequency, but prevail to some extent along the rivers and in the lowlands.

PNEUMONIA has become quite prevalent everywhere, and was noticed in Cottonwood, Susanville, Chico, Lemoore, Truckee, Eureka, Los Angeles, San Francisco, Sausalito, Salinas, Anderson, Fresno, Merced, Nevada City, Grass Valley, Gonzales, Mariposa, Bakersfield, and Red Bluff. The type is quite severe, but the fatality is limited, considering the number of persons attacked.

BRONCHITIS is mentioned in reports from Brownsville, Santa Cruz, Lodi, Igo, Lemoore, Eureka, College City, Anderson, Fresno, Redding, Benicia, San Francisco, Oakland, Sacramento, and Williams.

CONSUMPTION.—Our remarks in the monthly circular of last month, regarding the contagiousness of this disease, and the undesirability of inviting its victims to this coast, seems to have given great umbrage to our southern neighbors, who seem to look upon the solicitude of the State Board of Health for the sanitary welfare of the State as a direct blow to their prosperity, and an endeavor to prevent the immigration of diseased persons into their midst. The State Board has no such desire or power; it can only advise the public of the danger incurred from the promiscuous mingling of consumptives with healthy people, which is its duty. M. Delargy, in a paper contributed to the "Journal Hygiene," points out that certain mountain regions in Europe, formerly exempt from phthisis, have now become infected since intercourse with cities and phthical localities have been furnished, and considers the crowding together of a large number of phthical cases, in the most healthy localities, will soon have an unfavorable effect upon the purity of the atmosphere. Indeed, it may be said that consumption is never contracted except by contact, by association, or by living in close proximity. The length of time consumed by phthisis before proving fatal, enables it to infect all susceptible persons coming in contact with it, hence its great danger when not isolated. Cadeac and Malet, by experiment, proved that tubercular matter, dried and pulverized, was capable of transmitting the disease one hundred days after such preparation, and Pietro asserts that tubercular matter will retain its virulence ten months after drying. Desiccation or drying of the sputa seems to be the most effective way of disseminating the disease. Cornet found that of three hundred and eleven animals inoculated with the dust scraped from the rooms occupied by phthical patients, one hundred and sixty-seven died soon after; of these, one fifth were found to be tuberculous. He says, further, that a phthical patient, to be innocuous, must never, under any circumstances, expectorate upon the floor, or into a handkerchief, but always into a spittoon cup containing water, which must be disinfected and frequently changed. The danger of contagion from consumption is not exaggerated; preventive measures are as applicable to the south as they are to any other part of California, and the State Board of Health would be derelict in its duty if it did not point out this fact and call public attention to the necessity of caution in dealing with it.

PACIFIC COAST WEATHER.

The most marked meteorological feature of the month is the excessive rainfall occurring throughout California, which, over the greater part of the State, was more than double the heaviest October rainfall previously recorded. This large rainfall resulted in many localities in serious damage to crops, particularly in the case of raisins and table grapes. Rain fell in Northern California on the 7th, 8th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 25th, 26th, 27th, and 29th; in Southern California on the 8th, 13th, 18th, 20th, 21st, 22d, 23d; and in Oregon and Washington Territory on the 1st, 6th, 7th, 8th, 9th, 10th, 14th, 21st, 22d, 23d, 24th, 26th, 27th, 28th, 29th, and 30th.

TEMPERATURE.—The month was an unusually warm one in all of the Pacific Coast districts, the least departure from normal temperature occurring in Northern California. Mean temperature at selected stations was: Portland, Oregon, 57 degrees; Sacramento, Cal., 62 degrees; San Francisco, 62 degrees; Fresno, 63 degrees; Los Angeles, 66 degrees; San Diego, 65 degrees.

RAINFALL.—The rainfall was in excess of the normal amount south of a line drawn diagonally across Oregon from Portland to the southeast, and was less than the average October rainfall north of that line.

NOVEMBER, 1889.

Reports received from one hundred and four localities, with an estimated population of eight hundred and eighty-four thousand four hundred, give the number of deaths as nine hundred and ninety-two, which is a percentage of 1.17 + per thousand in the month, or an annual mortality at the rate of 14.04 +, which is a remarkably small death rate, and indicates a most favorable condition of the public health.

CONSUMPTION is credited with causing one hundred and fifty-six deaths during November, or little less than one sixth of the total mortality of the State for the month.

PNEUMONIA, being quite prevalent, caused sixty-three deaths, which is an increase over last report.

BRONCHITIS.—The mortality from this disease also shows an increase, thirty-eight deaths being recorded from it.

CONGESTION OF THE LUNGS caused twelve deaths.

WHOOPING-COUGH was fatal in four instances—three in San Francisco and one in Los Angeles.

DIPHTHERIA AND CROUP, collectively, caused forty-nine deaths, which is a large increase from last report. Of these, eighteen occurred in San Francisco, twelve in Los Angeles, four in Santa Barbara, two in Oakland, two in Santa Ana, two in Sacramento, two in Gonzales, and one each in Benicia, Gold Run, Downey, Pomona, and Redding.

DIARRHŒA AND DYSENTERY were fatal in eleven cases, which is a decrease from the mortality caused last month by these diseases.

CHOLERA INFANTUM also shows a marked decrease from last report, nineteen deaths being recorded in November and thirty-three in October.

SCARLET FEVER had the small mortality of four.

MEASLES caused no deaths.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER is credited with eight deaths.

TYPHOID FEVER caused forty deaths, which is a slight decrease from the mortality in October.

REMITTENT FEVER caused but two deaths.

CEREBRO-SPINAL FEVER is credited with nine deaths.

CANCER was fatal in thirty instances.

HEART DISEASE caused seventy deaths.

ALCOHOLISM is credited with eight deaths during the month.

The following towns reported *no deaths*: Alturas, Brownsville, Anaheim, Calico, Castroville, College City, Folsom, Kingsburg, Knights Ferry, Lincoln, Lakeport, Long Beach, Merced, Needles, North Bloomfield, San Pedro, Sausalito, Sierra City, and Wheatland.

PREVAILING DISEASES.

Reports received from over one hundred localities throughout the State continue to show a favorable condition of the public health. During the earlier part of the month disorders of the bowels seemed generally to prevail, but after the excessive rainfall in the latter part of November, diarrheal disorders were not noticed so frequently as diseases of the respiratory system, which prevailed in quite a number of localities.

DIARRHŒA AND DYSENTERY were noticed in reports from Knights Ferry, Newcastle, Hollister, Eureka, Needles, Oakdale, Downey, Redlands, Chico, Colton, Santa Paula, Traver, Lemoore, Redding, El Monte, San Bernardino, Salinas City, Fresno, Downieville, San Diego, Rio Vista, Stockton, and San Francisco.

CHOLERA INFANTUM was mentioned in reports from Salinas City, Knights Ferry, Lemoore, Needles, Fresno, San José, Ventura, Santa Ana, and San Francisco. The number of cases were exceedingly limited, and due in most instances to local causes.

SMALLPOX.—One case of this disease was reported from Humboldt County.

MEASLES appeared during the month in Livermore, Chico, Williams, and Sausalito.

SCARLET FEVER.—Some sporadic cases of this disease were reported in Livermore, Monrovia, Sacramento, Rocklin, San José, Alameda, Oakland, and San Francisco.

WHOOPING-COUGH was reported as present in Anaheim, Chico, Sausalito, and Mariposa.

ERYSIPELAS, in sporadic form, was noticed in Brownsville, Eureka, Calico, Needles, Livermore, Downey, Ontario, Soquel, Cottonwood, Lemoore, Truckee, Redding, Fresno, Merced, San Bernardino, San Diego, and Stockton.

TYPHOID FEVER was reported from Sacramento, Brownsville, Needles, Livermore, Cedarville, Redlands, Monrovia, Chico, Santa Cruz, Jolon, Lodi, Traver, El Monte, Dixon, Etna Mills, Salinas, College City, Fresno, Merced, Grass Valley, Los Angeles, Nevada City, Oakland, San José, Santa Rosa, Sisson, Watsonville, Woodland, and San Francisco.

REMITTENT FEVER was noticed in reports from Fresno, Ontario, Traver, Chico, Lemoore, San Bernardino, Truckee, Lockeford, Sausalito, Cottonwood, Lodi, Knights Ferry, and Hanford.

CEREBRAL FEVER.—Some cases of this disease were noticed in reports from Downey, Dixon, Napa, San Bernardino, Hollister, Oakland, San Francisco, Watsonville, and San José.

PNEUMONIA was quite prevalent during the month, and was observed with some frequency in Brownsville, Oakdale, Cedarville, Downey, Chico, Traver, Dixon, Sausalito, Truckee, Watsonville, Mariposa, Salinas, Fresno, College City, Alameda, Auburn, Cottonwood, Hanford, Hollister, Los Angeles, Nevada City, Oakland, San José, Stockton, Santa Rosa, and San Francisco.

BRONCHITIS was noticed in reports from Los Angeles, Hollister, Eureka, Vallejo, Livermore, San Pedro, Cloverdale, Ontario, Chico, Biggs, Sierra City, Williams, Lemoore, Redding, Fresno, Castroville, Alturas, San Bernardino, College City, El Monte, Pomona, Santa Barbara, Soquel, and San Francisco.

DIPHTHERIA AND CROUP were reported in Downey, Needles, Anaheim, Monrovia, Los Angeles, Santa Cruz, Jolon, Truckee, Gold Run, Redding, Mariposa, Salinas, Soledad, Ontario, Lockeford, Benicia, College City, Fresno, Santa Barbara, El Monte, Gonzales, Santa Ana, Oakland, Sacramento, and San Francisco.

In Gold Run, Placer County, there has been quite an epidemic of the disease, which Dr. Miner attributes to the bad sanitary condition of the town, and the neglect of sanitary precautions in isolating those attacked. It is very evident to all right thinking people that if we desire to limit the spread of contagious and infectious diseases, such as diph-

theria, scarlet fever, smallpox, typhoid fever, etc., a law upon the statute book will be necessary, making it compulsory upon all physicians, nurses, or householders, to notify the health authorities of the presence of infectious or contagious disease whenever it occurs within their knowledge. If we had such a law, and the failure to notify was punished by fine and imprisonment, we would, by timely notification, be enabled to confine the disease to its place of origin by isolation, and subsequently, by disinfection, to destroy the contagion before it had time to get abroad. We will grant that with measles and whooping-cough this would be most difficult, as their most infectious stage is just before the outbreak of the eruption in one case, and of the typical cough in the other. In these cases the contagion would be almost sure to have been diffused to a greater or less extent before the diagnosis of the diseases could have been made. But one of the most useful results of a law making the notification of infectious diseases compulsory, would be the fact that it would enable health officers to give timely warning of infected families to the school teachers and Trustees, so that the children of such families could be excluded, for the time being, from the public school, and the spread of infection stayed. From the culpable carelessness with which children from infected premises, or even with the first symptoms of illness upon them, are allowed to attend school, we cannot wonder that diphtheria and scarlet fever are spread. Of course a great deal of this is through ignorance of the dangerous nature of the infecting disease, and because it is generally unknown that the mildest attack in one child may produce the most malignant disease in another. Sanitary education will in time remove this difficulty, especially when the fact is fully recognized that these infectious diseases can be wholly controlled by timely precaution and proper quarantine measures.

PACIFIC COAST WEATHER.

WEATHER.—The first half of the month was marked by a general absence of rain, almost the entire rainfall for the month having fallen since the 17th. Rain fell in Oregon and Washington on the 9th, 10th, 11th, 12th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, and 30th; in Northern California on the 17th, 18th, 19th, 20th, 21st, 22d, 29th, and 30th; and in Southern California on the 18th, 19th, 29th, and 30th.

TEMPERATURE.—The mean monthly temperature at all stations was higher than usual, the least departure from the normal temperature occurring along the coast of Northern California. Mean monthly temperatures at selected stations were: Portland, Oregon, 48 degrees; Roseburg, Oregon, 47 degrees; Red Bluff, California, 54 degrees; Sacramento, California, 54 degrees; San Francisco, 59 degrees; Fresno, California, 54 degrees; Los Angeles, California, 61 degrees; San Diego, California, 62 degrees.

RAINFALL.—Throughout southwestern Oregon and Northern California the rainfall for the month was in excess of the normal amount. In other districts the deficiency was small, except in eastern Washington and the extreme southern portion of California.

DECEMBER, 1889.

Mortality reports received from ninety-four localities, containing an estimated population of seven hundred and eighty-one thousand nine hundred, give the number of deaths as nine hundred and sixty-three, a percentage of 1.23 per thousand in the month, or an annual mortality at the rate of 14.76, which is a slightly increased rate over previous month, but sufficiently low to indicate how favorable the condition of the public health was during December, as Dr. Billings, in his work for the tenth census of the United States, estimates the annual death rate for the whole country to be eighteen in one thousand, and this under the most favorable conditions.

CONSUMPTION.—The mortality from this disease increased during the month to one hundred and seventy-one.

PNEUMONIA also increased its mortality to eighty-one deaths, forty-five of which occurred in San Francisco.

BRONCHITIS caused thirty-eight deaths, which is also an increase over previous month.

CONGESTION OF THE LUNGS was fatal in nine instances.

WHOOPING-COUGH.—Only two deaths are reported from this cause—one in Stockton and one in San José.

DIPHTHERIA AND CROUP, collectively, caused thirty-five deaths—same number as in November. Eighteen of these occurred in San Francisco, three in Sacramento, three in Los Angeles, two in Redding, and one each in Anaheim, Colfax, Knights Ferry, Lakeport, Modesto, Riverside, San José, Santa Rosa, and Santa Cruz.

DIARRHEA AND DYSENTERY were less fatal than usual, thirteen deaths only being recorded against them.

CHOLERA INFANTUM had the small mortality of seven.

SCARLET FEVER caused but one death.

MEASLES caused no deaths.

TYPHO-MALARIAL FEVER is credited with two deaths only.

TYPHOID FEVER.—Forty-four deaths are reported from this cause, a slight decrease from previous report, but indicating an extensive prevalence of the disease.

REMITTENT FEVER caused three deaths.

CEREBRAL FEVER was credited with seventeen deaths, which is more than double the mortality from this cause as reported in November. The severe cold and rain during the month may have been an exciting cause of the disease.

CANCER is credited with twenty-nine deaths during the month.

HEART DISEASE caused sixty-five deaths.

ALCOHOLISM was fatal in four instances.

The following towns report *no deaths*: Calico, Downieville, Etna Mills, Elk Grove, Elnore, Forest Hill, Galt, Jolon, Merced, Ontario, Soquel, Ukiah, and Williams.

PREVAILING DISEASES.

Reports received from one hundred localities indicate an absence of serious epidemic diseases within the State. The extreme moisture and cold, which prevailed during the month, increased in a marked manner the frequency of all affections of the respiratory organs, with a corresponding fatality from consumption, pneumonia, and bronchitis.

DIARRHOEA and DYSENTERY, in a sporadic form, were noticed with some frequency in Eureka, Livermore, Pleasanton, Lemoore, Needles, Downey, Angels Camp, Susanville, St. Helena, Sausalito, El Monte, Fresno, Los Angeles, Oakland, Sacramento, and San Francisco.

VARICELLA, or CHICKENPOX, was present in Truckee and Sacramento.

MEASLES was observed in Colfax, Williams, Angels Camp, Pleasanton, Sausalito, and Dixon; in the latter town it may be said to be epidemic.

SCARLET FEVER, in mild form, was reported in Riverside, San Francisco, Elk Grove, and Benicia.

DIPHTHERIA and CROUP were quite frequently reported; the cases were all sporadic, and nearly in every instance confined to their place of origin. The contagious nature of the disease is very generally acknowledged, hence more care is taken to prevent its spread, and as a consequence we have no epidemic reported. These diseases were present during the month in San Francisco, Los Angeles, Downey, Anaheim, El Monte, Monrovia, Santa Cruz, San José, Santa Rosa, Salinas, Sacramento, Eureka, Redding, Colfax, Lodi, Lakeport, Anderson, Fresno, Rocklin, Modesto, and Knights Ferry.

WHOOPIING-COUGH was epidemic in Napa, and many cases were noted in Santa Cruz, Sacramento, Mariposa, Jolon, Sausalito, Fresno, Stockton, and San José.

ERYSIPELAS, in sporadic form, was noticed in Sacramento, Downey, Livermore, Angels Camp, Pleasanton, Truckee, Fresno, Igo, Cottonwood, Soquel, San Bernardino, Anaheim, Forest Hill, Long Beach, and San Francisco.

TYPHOID FEVER was quite prevalent throughout the State, and was reported in San Francisco, Los Angeles, Sacramento, Selma, Angels Camp, Pleasanton, Knights Ferry, Merced, Etna Mills, Jolon, Sausalito, El Monte, Monrovia, Newcastle, Cedarville, Santa Paula, Wheatland, Marysville, Woodland, Santa Barbara, Oakland, Healdsburg, Kingsburg, Needles, and Napa.

TYPHO-MALARIAL FEVER was reported in Santa Cruz, Lemoore, Angels, Igo, Merced, Rio Vista, and Anderson.

REMITTENT and INTERMITTENT FEVERS were observed in Lemoore, Knights Ferry, Lodi, Newcastle, Rio Vista, Anderson, and San Francisco. The severe rainfall has lessened the frequency of these paludal fevers, those now prevailing being very mild in character, and chiefly occurring in those persons subject to malarial attacks.

CEREBRO-SPINAL FEVER is mentioned in reports from Lockeford, Truckee, Oakland, San Francisco, Angels Camp, Anaheim, Healdsburg, Knights Ferry, and Marysville.

PNEUMONIA was observed with some frequency in Cedarville, Fresno, Dixon, Salinas, Eureka, Benicia, Williams, Redding, Needles, Downey, Pleasanton, Angels Camp, Lockeford, Watsonville, Susanville, Lakeport, Anaheim, Mariposa, El Monte, San Bernardino, Newcastle, Sacramento, Oakland, San José, and San Francisco.

BRONCHITIS was also reported in San Francisco, Sacramento, Oakland, Lemoore, Pleasanton, Livermore, Calico, Benicia, Williams, Redding, El Monte, Lockeford, Mariposa, Susanville, Lakeport, Anaheim, Watsonville, San Bernardino, Los Angeles, Newcastle, San José, Placerville, and Chico.

INFLUENZA was quite prevalent throughout the State, although not having as yet attained the severity which characterizes the disease as reported from Europe and the Eastern States. It is undoubtedly the same disease, and will become epidemic, although the type may be milder. No deaths from it have yet been reported, but many of our correspondents agree upon the fact that the disease is characterized by that extreme debility which is likely to prove fatal to the debilitated, or those suffering from previous sickness, or in the very aged.

JANUARY, 1890.

Mortality reports received from ninety-four localities, containing an estimated population of eight hundred and one thousand seven hundred, give the number of decedents as one thousand three hundred and eighty-five, a percentage of 1.72 per thousand in the month, or an annual mortality at the rate of 20.64, which is the largest death record we have had for many years. The greatly increased mortality is not owing to any epidemic of what is usually called zymotic disease, but is attributable to a mysterious pandemic influence which renders the human system particularly liable to pulmonary disorders, and particularly fatal to those whose lungs are already diseased or which take on acute inflammation. We find, for instance, that during the month of January—

CONSUMPTION was fatal in two hundred and seventy instances. This is double the usual monthly mortality from this disease, and exemplifies the depressing influence of the epidemic catarrh which is now passing over the State.

PNEUMONIA caused no less than two hundred and twenty-eight deaths, which is more than double the usual monthly mortality. In San Francisco the deaths from this cause were one hundred and forty-one, and in Los Angeles, where the climate is particularly favorable to these cases, the deaths numbered eighteen; in Sacramento, with an equally good climate, the deaths were seven; and in Santa Barbara five deaths occurred from this cause.

BRONCHITIS is credited with fifty-seven deaths, which is also a large increase over former reports.

CONGESTION OF THE LUNGS caused twenty-seven deaths, which is likewise in marked excess of the usual fatality.

WHOOPING-COUGH caused but one death.

DIPHTHERIA AND CROUP, collectively, caused forty deaths, which is a slight increase over the report for December. Of these deaths, twenty-three occurred in San Francisco, seven in Los Angeles, three in Nicolaus, and one each in Chico, Sacramento, Oakland, San Luis Obispo, Stanislaus, Stockton, and Truckee.

DIARRHEA AND DYSENTERY caused only eleven deaths, which is a very much lessened fatality from these diseases.

CHOLERA INFANTUM was fatal in but three instances.

SCARLET FEVER caused five deaths in San Francisco, one death in Alameda, and one in Santa Barbara.

MEASLES was fatal in four instances—two in San Francisco, one in Angels Camp, and one in Pleasanton.

TYPHO-MALARIAL FEVER is credited with two deaths.

TYPHOID FEVER.—Twenty-eight deaths are reported from this disease, which is a decrease of one half from the mortality reported during December.

REMITTENT AND INTERMITTENT FEVERS caused six deaths.

CEREBRAL FEVER is reported to have caused eleven deaths. Of these, two occurred in Oakland, one each in San Francisco, Alameda, Fresno, Lemoore, Martinez, Napa, Petaluma, San José, and San Luis Obispo. This is a decreased mortality from the December report.

CANCER is credited with thirty-four deaths during the month.

ERYSIPELAS caused but one death.

HEART DISEASE was fatal in ninety-three instances.

ALCOHOLISM was the cause of twenty deaths.

PREVAILING DISEASES.

Reports received from ninety-eight different localities in the State indicate an extremely limited prevalence of zymotic diseases, such as diphtheria, scarlet fever, measles, typhoid, and kindred specific afflictions, those mentioned being few in number and sporadic in character, whereas diseases of the respiratory organs, dependent in some measure upon meteorological conditions, exhibit a frequency and fatality which is phenomenal in this State. That this is owing to the great pandemic wave of epidemic catarrh, which is now spreading all over the State, rendering the populace more susceptible to inflammatory affections of the lungs, may be accepted as the probable explanation of the unusual frequency of the respiratory diseases which have prevailed during the past month. Those suffering from consumption were affected in a remarkable degree, prostration being the most noticeable symptom, and this often so severe that death ensued in a few days.

PNEUMONIA prevailed extensively throughout the State; was quite frequent in San Francisco, Oakland, Alameda, San José, Stockton, Sacramento, Los Angeles, San Diego, Watsonville, Downey, Fresno, Merced, Santa Barbara, Calico, Salinas, Eureka, Marysville, Anderson, Dixon, Ione, Benicia, Truckee, Chico, Lockeford, Kingsburg, Napa, Angels Camp, Lakeport, Redding, Galt, Nicolaus, Lemoore, and other towns.

BRONCHITIS was likewise very prevalent in Eureka, Benicia, Watsonville, San Francisco, Dixon, St. Helena, Pleasanton, Anaheim, Needles, Truckee, Santa Paula, Williams, Colfax, Colton, Cottonwood, Lemoore, Redding, Galt, Lodi, College City, El Monte, Calico, Fresno, Forest Hill, Merced, Los Angeles, Oakland, Sacramento, San José, San Luis Obispo, and Santa Barbara.

WHOOPING-COUGH does not prevail to any extent; it is mentioned in reports from Marysville, Sausalito, Jolon, Igo, Lemoore, Merced, and San Francisco.

DIPHTHERIA AND CROUP are not prevailing extensively; in Nicolaus, Sutter County, there was quite a number of cases, the origin of which was not reported. In San Francisco there were only seventeen cases reported during the month. Sporadic cases were also reported in Eureka, Anderson, Truckee, Benicia, Downey, El Monte, Fresno, Salinas, Chico, Oakland, Sacramento, San Luis Obispo, Stockton, and Stanislaus County.

SCARLET FEVER, in sporadic form, was noticed in Fresno, Chico, and San Francisco.

MEASLES was present in Ione, Pleasanton, Sausalito, Angels Camp, Livermore, and Fresno. The disease is reported as very mild, without any tendency to epidemicity.

SMALLPOX is absent from the State, no cases being reported.

ERYSIPELAS, in a mild form, was noticed in reports from Shasta, Benicia, Chico, Truckee, Downey, Igo, Colton, Lemoore, Hollister, Livermore, Calico, Salinas, and San Francisco.

CHOLERA INFANTUM is no longer reported as prevailing anywhere. A few cases were observed in Ione and San Francisco, but practically it is absent from the State.

DIARRHEA AND DYSENTERY no longer occupy a prominent place among the prevailing diseases. A few cases were noticed in Ione, Anderson, Shasta, Santa Paula, Downey,

Oakdale, Colton, Sierra City, Lemoore, El Monte, Newcastle, Placerville, and San Francisco.

TYPHOID FEVER is reported as observed in few instances in Anderson, Pleasanton, Chico, Ontario, Angels Camp, Igo, Colton, Cottonwood, Lodi, Merced, Salinas, Newcastle, Oakland, San Francisco, Santa Barbara, Los Angeles, and Tulare City. The late extensive rains seem to have had a salutary effect in diminishing the frequency of this fever, the reports of its prevalence during the past month being very meager.

REMITTENT AND INTERMITTENT FEVERS were observed in Anderson, Ione, Kingsburg, Chico, Truckee, Nicolaus, Cottonwood, Lemoore, El Monte, Fresno, and Knights Ferry.

CEREBRAL FEVER was noticed in a few sporadic cases in San José, San Luis Obispo, San Francisco, Petaluma, Oakland, Martinez, Napa, Alameda, Fresno, and Lemoore.

INFLUENZA, EPIDEMIC CATARRH, OR LA GRIFFE, prevailed extensively throughout the State from San Diego to Siskiyou. Dr. Tully, in a letter from Sierra City, says that it is there characterized by its tendency to attack the bronchial tubes and the substance of the lungs, but so far no deaths have occurred from it. In Gonzales, Dr. Hertel reports the disease as abating. In Salinas, Dr. May Gydison reports the disease as epidemic. Dr. Hayden reports a large number of cases in Fresno. Dr. Tebbits reports it epidemic in Hollister. Dr. Taggart also reports it epidemic in Tulare. In Redding, Dr. Mitchell says the disease is in a mild form, few cases requiring medical assistance. In Marysville, Dr. Powell reports influenza, but does not think it the genuine la grippe. The majority of our correspondents report the disease in a mild form and without fatality. Its mode of attack differs in many particulars. It may manifest itself by sneezing, headache, chilliness, cough, sore throat, earache, vomiting, or diarrhoea, or constipation, fever, dizziness, pain in the limbs, or nervous twitching, but none of these symptoms are constant. Heaviness over the eyes, redness of the eyeballs, intense pain in the back, in the limbs, and through the muscles, with a feeling of constriction round the throat or chest, are the commonest symptoms observed in la grippe. Its chief characteristic is, however, the extreme debility and prostration which accompanies its advent. This, with intense mental depression and profuse sweating, protracts the convalescence much longer than it might be supposed; and although the fever, headache, and muscular pains last but a few days under proper medical treatment, the heart depression, muscular weakness, and nervous debility take some time to overcome. As the cause of the disease is at present unknown, we can advise no means of prevention, but would recommend that medical advice be sought in all cases, as those suffering from previous disease, or debilitated from any cause, are very apt to succumb to a severe attack of la grippe, owing to the intense nervous prostration that ensues, and the tendency to heart failure that always accompanies the disease. Under proper stimulation this may be overcome, but to administer stimulants judiciously requires an educated judgment and a perfect comprehension of the object to be attained.

PACIFIC COAST WEATHER.

WEATHER.—The month has been marked by excessive precipitation and low temperatures throughout the Pacific Coast States. Rain or snow fell in Southern California on the 3d, 4th, 5th, 13th, 17th, 18th, 21st, 25th, and 26th; in Northern California on the 1st, 2d, 3d, 4th, 5th, 10th, 12th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 27th, and 30th, and in Oregon and Washington on all days except the 4th, 5th, 7th, 20th, and 21st.

TEMPERATURE.—At all stations the mean temperature for the month was lower than usual, the greatest departures from the normal occurring in Nevada and eastern Oregon, and the least in Southern California. Mean temperatures at selected stations were as follows: Spokane Falls, Washington, 18 degrees; Portland, Oregon, 32 degrees; Sacramento, California, 43 degrees; San Francisco, California, 46 degrees; Fresno, California, 42 degrees; San Diego, California, 51 degrees.

RAINFALL.—The rainfall for the month was in excess of the average January rainfall in all districts, and added to the heavy rains of October and December, makes the seasonal rainfall over the greater portion of California, from two to three times the normal amount.

FEBRUARY, 1890.

Mortality reports received for the month of February from one hundred and three localities, with a population estimated at eight hundred and twenty-two thousand nine hundred and fifty, give the number of decedents as eleven hundred and fifty-six, a monthly percentage of 1.44 per thousand, or a mortality at the rate of 17.28 per annum, which is a marked decrease from the mortality record in January, which gave an annual death rate of 20.64. It will be noticed, however, that diseases of the respiratory organs still occupy the most prominent place in the history of causation.

CONSUMPTION heads the list with two hundred and forty-nine deaths. This is a decrease of twenty-one from January report.

PNEUMONIA also presents the large mortality of one hundred and sixty deaths. Nevertheless, it is a decrease of sixty-eight from last report. Eighty-eight of these deaths occurred in San Francisco, eight in Sacramento, six in Oakland, five in Los Angeles, four in San José, and the remainder in smaller numbers in different parts of the State.

BRONCHITIS is credited with thirty-eight decedents. This is also a reduction of nineteen deaths from last report, although it is much in excess of the usual mortality record from this disease.

CONGESTION OF THE LUNGS was fatal to twelve persons, which is about half the mortality of previous month.

WHOOPIING-COUGH caused six deaths, which indicates an increase in the disease.

DIPHTHERIA AND CROUP, collectively, were fatal in eighteen instances, which is a marked decrease from fatality in January, when forty deaths were registered from these diseases.

DIARRHŒA AND DYSENTERY caused but five deaths, according to reports received. This is an unusually small death rate.

CHOLERA INFANTUM caused four deaths in San Francisco, the only ones reported in the State as far as heard from.

SCARLET FEVER was fatal in one instance only, and that in Oakland.

MEASLES.—Three deaths in San Francisco were reported from this cause.

TYPHO-MALARIAL FEVER was fatal in one instance, in Alameda.

TYPHOID FEVER is credited with twenty deaths, which is a decrease from January report.

REMITTENT AND INTERMITTENT FEVERS caused one death.

CEREBRO-SPINAL FEVER was fatal in five instances. Of these, three occurred in San Francisco, and two in Oakland.

CANCER caused twenty-two deaths.

ERYSIPELAS was fatal in but two instances—one in Lodi and one in Sacramento.

HEART DISEASE was fatal in eighty-one cases.

ALCOHOLISM was the cause of eight deaths.

PREVAILING DISEASES.

Reports of sickness observed in over one hundred localities throughout the State indicate a very well marked subsidence in the frequency and fatality of diseases of respiratory organs. The notes of a number of our correspondents convey the impression that in a majority of the districts heard from, the condition of the public health was much more satisfactory than was to be expected, considering the extremely inclement weather that prevailed throughout the month. The decrease in the prevalence of disorders of the bowels was quite noticeable, especially cholera infantum, which is hardly mentioned. The absence from our reports of typhoid fever as a prevailing disease is remarkable, and in some degree confirmatory of the observations of authorities upon this subject, that a copious and continued rainfall so flushes and washes out the impurities of the soil and the receptacles of filth that typhoid fever becomes perceptibly lessened in its frequency, if not entirely absent, from localities in which it before was prevalent.

PNEUMONIA was reported as frequently observed in San Francisco, Oakland, Ontario, Williams, Colfax, Santa Paula, Redding, Biggs, Galt, Truckee, Sacramento, Watsonville, Etna Mills, Sausalito, Lodi, Lemoore, Lockeford, Colton, Livermore, Napa, Santa Cruz, Anderson, Chico, Middletown, Downieville, Eureka, Lakeport, Nicolaus, Fresno, Dixon, and Marysville.

BRONCHITIS also prevailed to a greater or less extent in Brownsville, Anaheim, Etna Mills, Williams, Pleasanton, College City, Igo, Sierra City, Galt, Truckee, Sausalito, Cottonwood, Lemoore, Lockeford, Lodi, Anderson, Chico, Susanville, Eureka, Colton, Fresno, Sacramento, Dixon, and San Francisco.

WHOOPIING-COUGH is extending its field of operations. It is reported in San Francisco, Oakland, Sausalito, Stockton, Sacramento, Haywards, Napa, St. Helena, Mariposa, Jolon, Igo, and Los Angeles. The disease so far has proved very mild, and attended with very limited mortality.

DIPHTHERIA AND CROUP, as according to the very latest authorities they may be classed together as the same disease, were present during the month in a sporadic form in Anaheim, Oakdale, College City, Galt, Truckee, Eureka, Downey, St. Helena, Tehachapi, Salinas, and San Francisco. The disease was not epidemic in any locality reported, neither did it show any tendency to spread where it appeared. In San Francisco the cases reported were very limited in number and the mortality small.

SCARLET FEVER.—A few cases were reported in San Francisco, Oakland, Fresno, and Jolon.

MEASLES was observed in San Francisco, Pleasanton, Sausalito, Livermore, and Fresno.

SMALLPOX.—Dr. J. P. Booth writes that this disease was prevalent in Las Vegas, New Mexico, but was not allowed to pass the border, as far as could be ascertained. The fact of its appearance in New Mexico should warn us to prepare for its coming into this State again, and provide against its spread by vaccination and revaccination before it is too late. Health officers should see that all school children in their several districts comply with the law providing for vaccination, which is believed to be the most efficient mode of protection from this disease that the State is able to devise.

ERYSIPELAS in a mild form was observed in Hollister, Ontario, Pleasanton, Santa Paula, Sierra City, Truckee, Lodi, Livermore, Napa, Chico, Knights Ferry, Nicolaus, Tehachapi, Fresno, Salinas, and Newcastle.

CHOLERA INFANTUM was mentioned in but one report this month. It is practically absent from the State.

DIARRHŒA AND DYSENTERY were noticed in a few instances in Brownsville, College City, Sierra City, Anderson, Truckee, St. Helena, Colton, Tehachapi, Fresno, and Salinas. These diseases are not prevalent anywhere.

TYPHOID FEVER.—Sporadic cases of this disease were noticed in Etna Mills, Pleasanton, Santa Cruz, Jolon, San Francisco, Alameda, Oakland, Mariposa, Los Angeles, Nevada City, Pasadena, Petaluma, Pomona, San José, Yreka, Vallejo, and Sacramento.

REMITTENT AND INTERMITTENT FEVERS were noted in reports from Colton, Newcastle, Fresno, Knights Ferry, Chico, Anderson, Lockeford, Cottonwood, Galt, and Etna Mills. CEREBRAL FEVER was noted in Redding, Lockeford, San Francisco, and Oakland.

INFLUENZA is rapidly abating; although mentioned in nearly all of our reports as still present in the State, it is characterized by its mild form and general absence of fatality. Probably the next report will convey the intelligence of its total disappearance.

PACIFIC COAST WEATHER.

In Southern California the mean temperature for the month was slightly above the normal temperature for February, while in other Pacific Coast districts the month was slightly cooler than usual. Mean temperatures at selected stations were: Portland, Oregon, 38 degrees; Roseburg, 40 degrees; Red Bluff, California, 45 degrees; Sacramento, 48 degrees; San Francisco, 49 degrees; Fresno, 48 degrees; Los Angeles, 54 degrees; San Diego, 54 degrees.

Rain fell in Oregon and Washington on the 1st, 2d, 3d, 4th, 5th, 7th, 9th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 23d, 24th, 25th; in Northern California on the 4th, 5th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, and 25th; and in Southern California on the 16th, 17th, 18th, 21st, and 22d.

The rainfall for the month was least in Southern California, where it was about one half the usual amount, and gradually increased toward the north, becoming greatest in western Oregon, where it was about 40 per cent in excess of the normal rainfall.

MARCH, 1890.

Mortality reports received from one hundred and one localities, containing an estimated population of eight hundred and fifty-five thousand six hundred, give the number of decedents as eleven hundred and eighty-nine, a monthly percentage of 1.38 per thousand, or an annual mortality at the rate of 16.56 per thousand, which is a further decrease from the death rate in February, which was 17.28 per annum. Diseases of the respiratory organs still continue to add more than their quota to the bills of mortality, as they did in January and February. Their fatality is now on the decrease, although we find that—

CONSUMPTION caused the death of two hundred and thirty-three persons, which is nearly as great as the mortality of February.

PNEUMONIA likewise caused the death of one hundred and forty-three persons, which is a decrease of seventeen from last report, but yet far above the average deaths from this cause.

BRONCHITIS was fatal in forty-seven instances. This is an increase of eleven from last report, and indicates the great prevalence of the disease.

CONGESTION OF THE LUNGS was fatal in fifteen instances, which is a slight increase.

WHOOPIING-COUGH caused five deaths, three of which occurred in San Francisco, one in Stockton, and one in Los Angeles.

DIPHTHERIA AND CROUP, collectively, caused twenty-eight deaths—thirteen from diphtheria and fifteen from croup. Of the former, eight occurred in San Francisco, two in Los Angeles, and one each in Elmira, Riverside, and San Luis Obispo. Of croup, ten died in San Francisco, two in Los Angeles, and one each in Sacramento, Riverside, and Petaluma.

DIARRHEA AND DYSENTERY were fatal in eight instances only, which is a slight increase over last report, but still an unusually small mortality.

CHOLERA INFANTUM was not reported as having caused a single death, which is quite remarkable, as it is the first time it has failed to do so within the past year.

SCARLET FEVER was fatal in but one instance, and that in San Francisco.

MEASLES caused six deaths. Of these, four occurred in San Francisco, one in Vallejo, and one in Angels Camp.

TYPHO-MALARIAL FEVER was not reported as having caused any deaths.

TYPHOID FEVER was fatal in twenty-three instances, which indicates a slight increase over the mortality for February.

REMITTENT AND INTERMITTENT FEVERS are credited with two deaths only.

CEREBRO-SPINAL FEVER is reported to have caused thirteen deaths, which is a remarkable increase over the mortality of February. Three of these deaths occurred in San Francisco, two in Los Angeles, two in San José, and one each in Watsonville, Sacramento, Oakland, Alameda, Jackson, and Angels Camp.

ERYSIPELAS caused only two deaths.

CANCER was fatal in forty-one instances.

HEART DISEASE caused one hundred and two deaths.

ALCOHOLISM produced death in four instances.

PREVAILING DISEASES.

Reports received from one hundred and two different localities do not indicate much subsidence of the diseases of the respiratory organs so prevalent in January and February. Pneumonia, bronchitis, congestion of the lungs, and influenza were reported in almost every locality heard from. Influenza is, however, subsiding, and no longer partakes of the epidemic form. The Health Officer in Trinity County reports the death of fourteen Chinamen from "la grippe," which is a remarkable circumstance, as the Chinese,

as a rule, do not seem to be as susceptible to the disease as the white people. It must, however, be recollected that the accuracy of Chinese statements as to the nature of disease is very liable to error, as our Health Officers can testify. We must, therefore, make a large allowance for mistaken diagnosis in all such statements from Chinese sources.

PNEUMONIA was observed with some frequency in Healdsburg, Antioch, El Monte, Tehachapi, Watsonville, San Pedro, Bakersfield, Ione, Fresno, Biggs, Jolon, Truckee, Dixon, Haywards, Middletown, Anderson, Lockeford, Angels Camp, San Francisco, Oakland, Alameda, Berkeley, Calico, Mariposa, Etna Mills, Los Angeles, Marysville, Nevada City, Sacramento, San José, Santa Ana, Stockton, and Woodland.

BRONCHITIS was quite prevalent in Sacramento, Dixon, Pleasanton, Healdsburg, Tehachapi, Biggs, El Monte, Bakersfield, Eureka, Ione, Fresno, Needles, Anderson, Galt, Lockeford, Shasta, College City, Middletown, Etna Mills, San Francisco, Oakland, San José, and Los Angeles.

WHOOPING-COUGH was reported in San Francisco, Stockton, Los Angeles, Mariposa, Napa, El Monte, and Sacramento. The disease continues to be very mild, and extending very slowly.

DIPHTHERIA AND CROUP.—Sporadic cases are reported in Stockton, Riverside, San Pedro, San Luis Obispo, Bakersfield, Livermore, Martinez, Truckee, Downey, Vacaville, Los Angeles, Petaluma, Sacramento, and San Francisco. The precautions that are now generally taken to isolate the patients afflicted with these diseases seems to be effective in preventing the spread of the infection, as no reports of the disease being epidemic in any locality have been received. In Riverside, Dr. Sherman reports the cases as more numerous than common. The type is probably mild, as the mortality is limited. In San Francisco diphtheria was more prevalent than in the preceding month.

SCARLET FEVER.—A few cases occurred in San Francisco. It is not reported as being present in any other locality.

MEASLES is reported as epidemic in Healdsburg. Some cases were also reported in El Monte, Fresno, Angels Camp, North Bloomfield, Nicolaus, Vallejo, and San Francisco.

SMALLPOX is not reported in California. The State Board of Health of Connecticut reports the disease in Meridian, in that State, to the number of nineteen cases. As this disease can be transported in clothing or baggage, the importance of our knowledge of the places of its existence cannot be overestimated. This object is attained through the National Conference of State Boards of Health adopting the resolutions to the effect that a duty is imposed upon each State to duly notify every other State of the existence of contagious and infectious diseases wherever in their respective States they may occur. We are thus enabled to watch the tide of travel from these infected districts and take all precautions possible to prevent the transportation of the disease to our borders.

ERYSIPELAS in sporadic form was noticed in El Monte, Lodi, Susanville, Fresno, Bakersfield, Eureka, Truckee, Anderson, Downey, Angels Camp, Nicolaus, Calico, Antioch, and San Francisco. The disease was of a mild type, with a very limited mortality.

CHOLERA INFANTUM was noticed in reports from Lodi, San Pedro, and Ione, but elsewhere throughout the State was not mentioned. As this disease is contemporaneous with increase of temperature, we cannot expect immunity from it much longer.

DIARRHEA AND DYSENTERY were observed with some frequency in Eureka, Bakersfield, El Monte, San Pedro, Fresno, Cottonwood, Anderson, Pleasanton, Alameda, Modesto, Los Angeles, Truckee, Oakland, Placerville, and San Francisco.

REMITTENT AND INTERMITTENT FEVERS are becoming quite prevalent throughout the State. We noticed them mentioned in reports from Knights Ferry, Colfax, Lodi, Bakersfield, San Pedro, Ione, Fresno, Needles, Truckee, Cottonwood, Middletown, Anderson, Lockeford, Oakdale, Etna Mills, Oakland, and San Francisco.

CEREBRAL FEVER was noted in St. Helena, Rocklin, Susanville, Sacramento, San Pedro, Etna Mills, Angels Camp, Alameda, Jackson, College City, Los Angeles, Oakland, San Francisco, San José, and Watsonville.

TYPHOID FEVER is noted in our reports from Sacramento, Jolon, Lodi, San Pedro, Nicolaus, Etna Mills, Los Angeles, Petaluma, Oakland, San José, San Diego, Santa Ana, and San Francisco. The disease is not as prevalent as it will be when the ground begins to dry out after the excessive rainfall. We should, at this time, remember that the occurrence of unusual amounts of rain supersaturating the earth disturbs the contents of privies and cesspools, causing the carriage from these receptacles to be deposited in new localities, and perhaps at far distant points. Now, supposing any of the contents of these privies and cesspools contained the germs of typhoid fever, their deposition on the ground, and subsequent desiccation or carriage into our water supply, might be the cause of a serious epidemic. We know, at all events, that the putrefaction of organic matter is inimical to health, and the debris left after the subsidence of large accumulations of water should be removed from around our dwellings, our outhouses, our alleys, and our streets, carried away and buried deep or burned. The cleansing of our premises is now a wise precaution against future sickness, and as typhoid fever is peculiarly a filth disease, its mode of prevention is essentially *cleanliness*.

The typhoid germ can be swallowed in food as well as drank in water. Professor Vaughan, of the Michigan University, discovered the bacillus in sewer air, and Dr. Baker, the eminent Secretary of the State Board of Health of Michigan, contracted the disease, it is supposed, from the air of this very same sewer. Our Health Officers are therefore requested to urge upon their several districts the extreme necessity that exists at this time to remove all accumulations of debris and filth from about their habitations, as what are now comparatively harmless deposits, will, in the presence of increasing temperature, become masses of putrescent and dangerous organic matter, that is certain

to deteriorate the health and infallibly expose the system to a condition favorable to the receptivity of disease germs and their successful cultivation in the soil thus prepared for their accommodation and development. It is only by the education of the public to these dangers that we can hope to avoid them, and to the Health Officers the public look for such information, and such safeguards to its health, which their education in sanitation particularly enables them to supply and direct.

INFLUENZA, although very much lessened in the number of persons attacked, still lingers in the State, and occasionally shows itself with increased severity. It is probable that the warm weather advancing upon us will dissipate the disease completely, leaving us nothing but the memory of its presence.

PACIFIC COAST WEATHER.

The month has been one of frequent showers, with few severe storms. Rain fell in Oregon and Washington on the 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 16th, 17th, 18th, 19th, 22d, 23d, 25th, 26th, 29th, and 30th; in Northern California on the 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 18th, 19th, 22d, 23d, 25th, 29th, 30th; and in Southern California on the 5th, 18th, 19th, 20th, and 26th.

The temperature was about normal except in Southern California, where it was about 5 degrees higher than usual during March.

The mean temperature at selected stations was as follows: Portland, Oregon, 45 degrees; Roseburg, 46 degrees; Red Bluff, 51 degrees; Sacramento, 53 degrees; San Francisco, 54 degrees; Fresno, 55 degrees; Los Angeles, 58 degrees; San Diego, 56 degrees.

The rainfall was slightly in excess of the normal for March in Oregon, Washington, and Northern California, while in Southern California less than one half of the usual amount fell.

APRIL, 1890.

Mortality reports received from one hundred localities throughout the State, containing an estimated population of eight hundred and twenty-five thousand one hundred and fifty, give the number of decedents as ten hundred and thirty-seven, a monthly percentage of 1.28 per thousand, or an annual mortality at the rate of 15 per thousand, which is a marked decrease from the rate of the preceding three months, and indicates a decidedly favorable condition of the public health throughout the State. Diseases of the respiratory organs along the coast counties were quite fatal and added materially to the death rate. Deaths from zymotic diseases were quite limited, and added but a small fraction to the total mortality.

CONSUMPTION caused one hundred and seventy-eight deaths, which, while above the average, is considerably less than has occurred during the previous months from this cause.

PNEUMONIA is credited with one hundred and two deaths, which is also a decrease of over one third of those reported monthly since December. Seventy of these deaths occurred in San Francisco and eight in Oakland, the balance being in small numbers in different parts of the State.

BRONCHITIS caused fifty deaths, which is a slight increase from the number reported last month. Of these thirty-three occurred in San Francisco, four in Oakland, three in Los Angeles, the balance in small numbers here and there.

CONGESTION OF THE LUNGS is reported as causing ten deaths.

WHOOPING-COUGH was fatal in four instances.

DIPHTHERIA AND CROUP, collectively, caused twenty-seven deaths—seventeen from diphtheria and ten from croup. Of the former, thirteen occurred in San Francisco, one in Santa Rosa, one in Sacramento, one in Alameda, and one in Downey. Croup caused eight deaths in San Francisco, one in Los Angeles, and one in Healdsburg.

CHOLERA INFANTUM is credited with only two deaths—one in Anaheim, and one in San Francisco.

DIARRHŒA AND DYSENTERY were fatal in but six instances, which is a remarkably small mortality from these diseases, considering their frequency.

SCARLET FEVER was fatal in three instances in San Francisco.

MEASLES caused thirteen deaths in San Francisco. No other deaths reported from it.

TYPHO-MALARIAL FEVER caused no deaths.

TYPHOID FEVER is credited with twenty deaths, a slight decrease from March report.

REMITTENT FEVER.—One death from this cause is reported.

CEREBRO-SPINAL FEVER caused seventeen deaths, which is an increase over previous report. Of these deaths four occurred in Oakland, three in San Francisco, three in Los Angeles, two in Sisson, and one each in Santa Maria, Riverside, Oakdale, Lincoln, and Chico.

ERYSIPELAS caused only two deaths, both in San Francisco.

CANCER was fatal in thirty-two instances.

HEART DISEASE caused eighty-eight deaths.

ALCOHOLISM produced death in seven instances.

NO DEATHS were reported as having occurred in Alturas, Angels Camp, Biggs, Calico, Colusa, Cottonwood, Cloverdale, El Monte, Grass Valley, Hollister, Igo, Jolon, Little Stony, Nevada City, Newcastle, Orland, Rio Vista, Roseville, Sausalito, Shasta, Suisun, and Wheatland.

PREVAILING DISEASES.

Reports received from one hundred localities indicate a very favorable condition of the public health during the month of April, characterized by an entire absence of epidemic disease throughout the State, and a minimum amount of endemic zymotic disease wherever it did exist. The very favorable weather that prevailed throughout the month had a beneficial effect on the respiratory organs, and hence pneumonia was not so prevalent, although bronchitis continued to be observed quite frequently. Influenza has nearly disappeared, and is mentioned in but few reports.

PNEUMONIA, in sporadic form, was met with in Sacramento, Colfax, Livermore, Newcastle, Fresno, Chico, Bakersfield, Brownsville, Biggs, Lodi, Truckee, Middletown, San Juan, San José, Gridley, Mendocino, Oakland, Vallejo, Healdsburg, Riverside, Folsom, Pasadena, Petaluma, Pomona, Stockton, Davisville, and San Francisco.

BRONCHITIS was more or less prevalent in Downey, Merced, Colfax, Igo, San Bernardino, Lockeford, Fresno, College City, El Monte, Chico, Bakersfield, Mariposa, Brownsville, Pleasanton, Lodi, Middletown, Dixon, Eureka, Anaheim, Los Angeles, Lakeport, Oakland, San Francisco, Woodland, and Sacramento.

WHOOPIING-COUGH was prevalent in Merced, Jolon, Fresno, El Monte, Lodi, Napa, Sausalito, Mariposa, Los Angeles, Oakland, Pomona, and San Francisco. The "Sanitary Record," in its last issue, justly says: "Whooping-cough is too often regarded in the light of a trifling and unavoidable malady, and it rarely happens that the slightest precaution is taken against its spread by infection. Some amount of blame moreover attaches to medical men, who, in many cases, fail to insist upon the necessity of isolation and disinfection. Yet the live contagion of whooping-cough is not less active, distinct, and subtle than that of scarlet fever or smallpox. * * * As in many other affections, although the number of deaths as immediate result of the disease is of itself great, yet it may be doubtful if the remote mortality is not much greater. The strain on the delicate lung tissues leads to emphysema and other grave complications that often prove fatal after the lapse of many years. Meanwhile, let parents be taught to regard this scourge in a truer light, by avoiding the bringing of their children in contact with the disease, where it can possibly, by diligent inquiry, be ascertained to be present."

DIPHTHERIA and **CROUP** were not prevalent in any locality. Some sporadic cases were reported in San Francisco, Sacramento, Downey, Soledad, Healdsburg, Truckee, Anaheim, Alameda, Santa Rosa, Livermore, College City, Biggs, Lakeport, and Los Angeles.

SCARLET FEVER.—A few cases were reported in Livermore and San Francisco.

MEASLES was quite prevalent in San Francisco; it was also reported in Livermore, Santa Cruz, Fresno, El Monte, Healdsburg, Mariposa, Williams, Cloverdale, and Sausalito.

SMALLPOX.—No cases have yet appeared in California. Dr. J. P. Booth, our Sanitary Officer at Needles, reports that in Las Cruces, New Mexico, there were at the time of writing one hundred and fifty cases, and the deaths very numerous. As this town is on the line of the Santa Fe Railroad, the disease may come in by the way of Yuma. We ought, therefore, to be forearmed by the vaccination of those unvaccinated, and especially the children attending the public schools, as the law provides.

ERYSIPELAS was reported in San Francisco, Newman, San Bernardino, Santa Cruz, Shasta, Fresno, El Monte, Chico, Sacramento, Brownsville, Biggs, Needles, and Lakeport. The disease was of a mild type.

PAROTIDITIS, or **MUMPS**, was prevalent in Madera, Brownsville, and College City.

DIARRHEA and **DYSENTERY** were noticed with increased frequency in our reports. They were observed in Fresno, Newman, Santa Paula, Bakersfield, Shasta, Calico, Nevada City, Williams, Needles, Sausalito, Eureka, Los Angeles, San José, and San Francisco.

TYPHOID FEVER was noticed in reports from Sacramento, Lockeford, Santa Paula, Chico, Cloverdale, Nevada City, Pleasanton, Middletown, Los Angeles, Petaluma, Oakland, Redlands, San José, Santa Ana, Cottonwood, College City, Igo, and Davisville.

REMITTENT and **INTERMITTENT FEVERS** are noticed in nearly all our reports. As they are incidental to the abating of the waters and the increase of temperature, their frequency may be expected as the summer advances.

CEREERO-SPINAL FEVER, which is a much more serious disease, was noticed in reports from San Francisco, Los Angeles, Oakland, Livermore, Fresno, Lincoln, Riverside, Santa Maria, Chico, and Sisson. In connection with these zymotic affections we cannot but regret that the example of Minnesota is not followed in this State. There the law requires that in the month of May, or oftener in each year, the Health Officer shall make a thorough sanitary inspection of the city, town, or village under his jurisdiction, and present a written report of such inspection at the next meeting of the Board of Health, and shall forward a copy of such report, as soon as rendered, to the State Board of Health. This wise provision of the law has been followed by the most salutary results. It gives the Health Officer a complete knowledge of the sanitary condition of the town, and in case of an outbreak of disease he is in a position to know its probable cause, and is thus quickly enabled to use the means necessary for its suppression or its extinction, to the saving of many lives and the great monetary interest of the community.

PACIFIC COAST WEATHER.

The weather during April presents few marked features. The month has been one with few rainy days and no severe storms. Rain fell in Oregon and Washington on the 2d, 4th, 5th, 6th, 7th, 11th, 17th, and 18th; in Northern California on the 6th, 17th, and 18th; and in Southern California on the 18th. Local showers also fell in Northern California

on the 29th and 30th. The mean monthly temperatures at reporting stations have been slightly higher than usual, the largest departures from normal temperatures occurring in Southern California. The rainfall for the month has been deficient in all the Pacific States, being least in Southern California, and greatest in the northern quarter of the same State.

MAY, 1890.

Mortality reports received from one hundred and three cities and towns throughout the State, with an estimated population of seven hundred and sixty-six thousand six hundred and twenty-five, give the number of decedents as one thousand and twenty-two, a monthly percentage of 1.33 per thousand, or at the rate of 15.96 per annum, which is a slight increase over last month. The principal causes of death are to be found among the diseases of the lungs and heart.

CONSUMPTION caused one hundred and sixty-four deaths.

PNEUMONIA is credited with ninety-seven deaths, seventy of which occurred in San Francisco, the remaining twenty-seven being scattered throughout the State, indicating a marked diminution in the frequency of the disease.

BRONCHITIS gives a record of forty-four deaths. Of these, thirty-three occurred in San Francisco, the remainder in single cases elsewhere.

CONGESTION OF THE LUNGS was fatal in nine instances.

WHOOPING-COUGH was the cause of four deaths.

DIPHTHERIA AND CROUP, collectively, were fatal in twenty-seven instances. Of these, sixteen were from diphtheria and eleven from croup. Of the former, thirteen occurred in San Francisco, one each in Stockton, Los Angeles, and Gridley. Croup caused eight deaths in San Francisco, two in Knights Ferry, and one in Los Angeles.

CHOLERA INFANTUM is credited with six deaths in May. One each in Bakersfield, Salinas, San Francisco, San José, Needles, and Fresno. This is an increase of four over last report.

DIARRHŒA AND DYSENTERY were fatal in sixteen cases, which is more than double the mortality of the preceding month, and indicates an increased frequency of occurrences of these diseases.

SCARLET FEVER was fatal in four cases—three in San Francisco and one in Woodland.

MEASLES caused thirteen deaths in San Francisco and one in Los Angeles.

TYPHO-MALARIAL FEVER was fatal in but one instance.

TYPHOID FEVER caused sixteen deaths, which is a decreased mortality from the previous month.

REMITTENT FEVER is credited with but two deaths.

CEREBRO-SPINAL FEVER caused seven deaths, which is a decrease of over one half from the previous report. Three of these deaths occurred in San Francisco, and one each in Stockton, San José, Los Angeles, and Lakeport.

ERYSIPELAS caused two deaths in San Francisco and one in Sacramento.

CANCER was fatal to forty-four persons.

HEART DISEASE caused eighty-four deaths.

ALCOHOLISM caused eight deaths.

No deaths were reported in Visalia, Truckee, Rocklin, Roseville, Oakdale, Newman, Nevada City, Madera, Long Beach, Jolon, Igo, Forest Hill, Elsinore, Downieville, Dixon, Colfax, Colton, or Biggs.

PREVAILING DISEASES.

Reports of sickness received from ninety-two localities give very favorable records regarding the general health of the public. We find in many places that measles prevails to a large extent, and that whooping-cough is almost epidemic in one or two localities. The weather for the month of May being quite favorable to those suffering from diseases of the respiratory organs, a marked decrease was noted in the prevalence of pneumonia, bronchitis, and influenza, while on the other hand an increased prevalence was noted in the frequency of bowel and stomach disorders.

CHOLERA INFANTUM was observed in Fresno, Ione, Bakersfield, Cottonwood, Salinas, and Needles.

DIARRHŒA AND DYSENTERY were also mentioned in reports from Cloverdale, Anaheim, El Monte, Shasta, Fresno, Downey, Riverside, Bakersfield, Ione, Gridley, Redding, Needles, Livermore, Etna Mills, Colusa, Rio Vista, Alameda, Antioch, Los Angeles, and Santa Barbara.

MEASLES was noticed during the month in Sacramento, Mariposa, Antioch, El Monte, Watsonville, Fresno, Dixon, Jolon, Middletown, Azusa, Hollister, Eureka, Los Angeles, and San Francisco.

SCARLET FEVER.—Some sporadic cases appeared in Sacramento, El Monte, Fresno, Woodland, Biggs, Ontario, Lodi, Rio Vista, and San Francisco. The type thus far has been exceedingly mild, and in most cases was confined to its place of development.

DIPHTHERIA AND CROUP were present in Mariposa, Live Oak, Anaheim, Stockton, Merced, Elk Grove, Eureka, Gridley, Williams, Redding, Rio Vista, Knights Ferry, Los Angeles, and San Francisco. The cases were sporadic, without epidemic tendency.

WHOOPING-COUGH prevailed to some extent in Napa, El Monte, Merced, Cloverdale, Redding, Azusa, Hanford, Pomona, and San Francisco.

ERYSIPELAS is noted in reports from Sacramento, San Francisco, Fresno, Downey, Calico, Eureka, Redding, Susanville, Shasta, and College City.

TYPHOID FEVER has prevailed to a limited extent without any apparent tendency to epidemicity, and depending in most cases upon local causes. It was noted in San Francisco, Chico, Etna Mills, Sacramento, El Monte, Haywards, Pomona, Santa Ana, Santa Paula, Sisson, Merced, Napa, Nevada City, Salinas, and Pleasanton.

TYPHO-MALARIAL FEVER was reported in Shasta, Fresno, College City, Igo, Cloverdale, Cottonwood, Anaheim, and Rio Vista.

REMITTENT FEVER was observed with some frequency in Sacramento, El Monte, Fresno, Ione, Riverside, Bakersfield, Merced, Newcastle, Redding, Needles, Lodi, Knights Ferry, and San José.

CEREBRAL FEVER was noted in Lakeport, Riverside, Stockton, Lodi, San José, San Francisco, and Nevada City.

PNEUMONIA is mentioned in but few reports for May. Sporadic cases are reported in Fresno, Lakeport, Bakersfield, Etna Mills, Nevada City, Susanville, St. Helena, Alameda, Calico, College City, Pleasanton, Cottonwood, Eureka, Folsom, Healdsburg, Shasta, Knights Ferry, Los Angeles, Martinez, Placerville, Sacramento, Santa Rosa, Watsonville, Yreka, San José, Santa Ana, and San Francisco, where the disease was quite prevalent.

BRONCHITIS appears to be more prevalent than pneumonia, in the form of bronchial catarrh rather than acute bronchitis. Many cases were observed in Sacramento, Galt, Anaheim, Alameda, Downey, Fresno, Colfax, Middletown, Igo, Hollister, Martinez, Santa Paula, Bakersfield, Ione, Williams, Redding, Lodi, Etna Mills, Santa Maria, Ontario, Pasadena, San José, Placerville, Grass Valley, San Francisco, and Pleasanton.

VARICELLA, OR CHICKENPOX, is reported in few places.

SMALLPOX.—No cases of this disease were reported in California. Dr. S. S. Herrick, the Medical Inspector appointed by this Board to investigate the towns near the southern border of the State, reported to be the seat of smallpox, finds upon personal examination that the account received by the State Board of Health was very much exaggerated. He discovered no cases along the route of the Southern Pacific Railway, but found that there was smallpox in Las Cruces and other contiguous villages in New Mexico, but none so close to railroad travel as to seriously threaten us at present. Every precaution has been taken to prevent the spread of the disease in California, and it is to be hoped our efforts will be successful in this respect.

We are glad to be able to report the decision of the Supreme Court upholding the constitutionality of the law making compulsory the vaccination of all children attending the public schools of the State. The following is a synopsis of the case tried and the Court's decision:

Action was brought in the Superior Court of Santa Cruz County by D. K. Abeel against D. C. Clark, Principal of the High School of that county, to compel the admission to the school of his two sons, D. K. and James, who were refused admission to the school because of non-compliance with the Vaccination Act, and the Court gave judgment in favor of the Principal. Abeel took an appeal to the Supreme Court, which tribunal has affirmed the decision of the Court below. The Court says:

"The Act referred to is designed to prevent the dissemination of what, notwithstanding what medical science has done to reduce its severity, still remains a highly contagious and much dreaded disease. While vaccination may not be the best and safest preventive possible, experience and observation, the test of the value of such discoveries, dating from 1796, when Jenner disclosed it to the world, have proved it to be the best method known to medical science to lessen the liability to infection with the disease.

"This being so, it seems highly proper that the spread of smallpox through the public schools should be prevented or lessened by vaccination, thus affording protection both to the scholars and the community.

"Vaccination, then, being the most effective method known of preventing the spread of the disease referred to, it was for the Legislature to determine whether the scholars of the public schools be subjected to it, and we think it was justified in deeming it a necessary and salutary burden to impose upon that general class. The remarks of Judge Cooley, in his work on Constitutional Limitations, page 157, are applicable here, where he says: 'What is for the public good, and what are public purposes, and what does properly constitute a public burden, are questions which the Legislature must decide upon its own judgment, and in respect to which it is invested with a large discretion which cannot be controlled by the Courts, except, perhaps, when its action is clearly evasive, and where under pretense of lawful authority it has assumed to exercise one that is unlawful.'"

This decision will be of invaluable benefit to the State in a sanitary point of view, compelling, as it does, Boards of Education and School Superintendents to do their duty in the premises, and give children that protection from disease to which they are entitled by the State. If the rising generation is generally and carefully vaccinated with pure virus, in the hands of competent operators, we may very soon bid defiance to any extensive invasion of smallpox. To obtain this result, however, vaccination must not be intrusted to any incompetent to determine which is a true and which a spurious vaccine vesicle. Upon this depends the value of the operation, the true vesicle being as infallibly protective as the spurious as surely fails in any protecting qualities. We must, therefore, urge upon Boards of Education and School Superintendents to discountenance, as far as possible, the vaccination of those committed to their care by any but educated physicians. The safety of the children is too serious a matter to be left in doubt, and doubt there will be where incompetence to distinguish success from failure prevails.

PACIFIC COAST WEATHER.

The weather during May has been generally favorable to the growing crops in the Pacific Coast States, the light rains at the end of the month in Oregon and Washington being particularly beneficial.

Rain fell in Northern California on the 6th, 7th, 8th, 9th, 10th, and 11th; in Southern California on the 8th, 9th, 10th, 26th, and 27th; in Oregon on the 6th, 7th, 8th, 9th, 10th, 19th, 29th, and 31st; and in Washington on the 8th, 9th, 10th, 11th, 19th, 29th, and 31st. In Central California and Southern California the rains were light and local.

The temperature has, during the greater part of the month, been higher than the normal May temperature, short periods of cool weather occurring, however, from the 6th to the 12th, and from the 26th to the 31st.

JUNE, 1890.

Mortality reports received from one hundred and nine cities and towns throughout the State, with an estimated population of eight hundred and twenty-four thousand three hundred and fifty, give the number of decedents as one thousand and sixty-six, which is a monthly percentage of 1.29 per thousand, or an annual mortality at the rate of 15.48, which is a decrease from the percentage in May. Until the official result of the late census is published, we have to accept the estimated population as furnished by our correspondents, and which we know now to be in many instances much exaggerated. Our actual death rate is, therefore, uncertain until we can get the correct, or nearly correct, number of the population affected. There has been very little zymotic disease reported as particularly fatal, except cerebral fever and cholera infantum, and these in limited number.

CONSUMPTION caused the largest mortality, one hundred and fifty-four deaths being reported from it.

PNEUMONIA was fatal in sixty-eight instances, which is a decided decrease from former report.

BRONCHITIS caused thirty deaths.

CONGESTION OF THE LUNGS, twelve.

WHOPING-COUGH was fatal in three instances.

DIPHTHERIA and CROUP, collectively, were reported as causing thirty-five deaths, which indicates a very much lessened prevalence of the disease. Twenty-six were from diphtheria, and nine from croup; of the former, seventeen were credited to San Francisco, one occurred in Santa Ana, and one each in Sacramento, San Bernardino, Oakland, and Martinez, and two each in Los Angeles and Oakdale; and of the latter, one death occurred in Vallejo, San José, Woodland, and Long Beach, and five in San Francisco.

CHOLERA INFANTUM is credited with fifty-one deaths in June, which is a marked increase over the mortality recorded from this disease last month.

DIARRHŒA and DYSENTERY caused nineteen deaths.

SCARLET FEVER was fatal in but two instances, both in Oakland.

MEASLES caused but five deaths, two occurring in Los Angeles.

TYPHO-MALARIAL FEVER was fatal in five instances.

TYPHOID FEVER caused eighteen deaths.

REMITTENT FEVER is credited with two deaths.

CEREBRO-SPINAL FEVER caused twenty-one deaths, which is an increased mortality. Two each occurred in Stockton, Hanford, and Los Angeles, and one each in Alameda, Anaheim, Benicia, Berkeley, Davisville, Jackson, Martinez, Mendocino, Napa, Oakland, Suisun, and Visalia; three in San Francisco.

ERYSIPELAS was fatal in one instance.

CANCER is credited with twenty-seven deaths.

HEART DISEASE caused seventy-nine deaths.

ALCOHOLISM was fatal to five persons.

DEATHS FROM CAUSES not classified in this abstract, numbered four hundred and fifty.

PREVAILING DISEASES.

Reports received from eighty-four localities in different parts of the State indicate an improved condition of the public health. Respiratory diseases are no longer mentioned as prevailing to any extent, except bronchitis, which is noticed with some frequency in our reports of sickness. Disorders of the bowels were prevailing to some extent, and some few cases of cholera morbus were noticed. This disease was no doubt induced in many cases by eating of unripe or unsound fruit or vegetables. Zymotic diseases, such as measles, scarlet fever, diphtheria, etc., were not prevalent anywhere, and where present were in a mild form, without any tendency to spread or become epidemic.

CHOLERA INFANTUM.—Some cases of this disease were observed in Bakersfield, Lodi, Anderson, Gridley, Needles, Napa, Chico, Santa Paula, Sacramento, Oakdale, Oakland, Pomona, San José, Tulare, El Monte, Salinas, Martinez, and San Francisco.

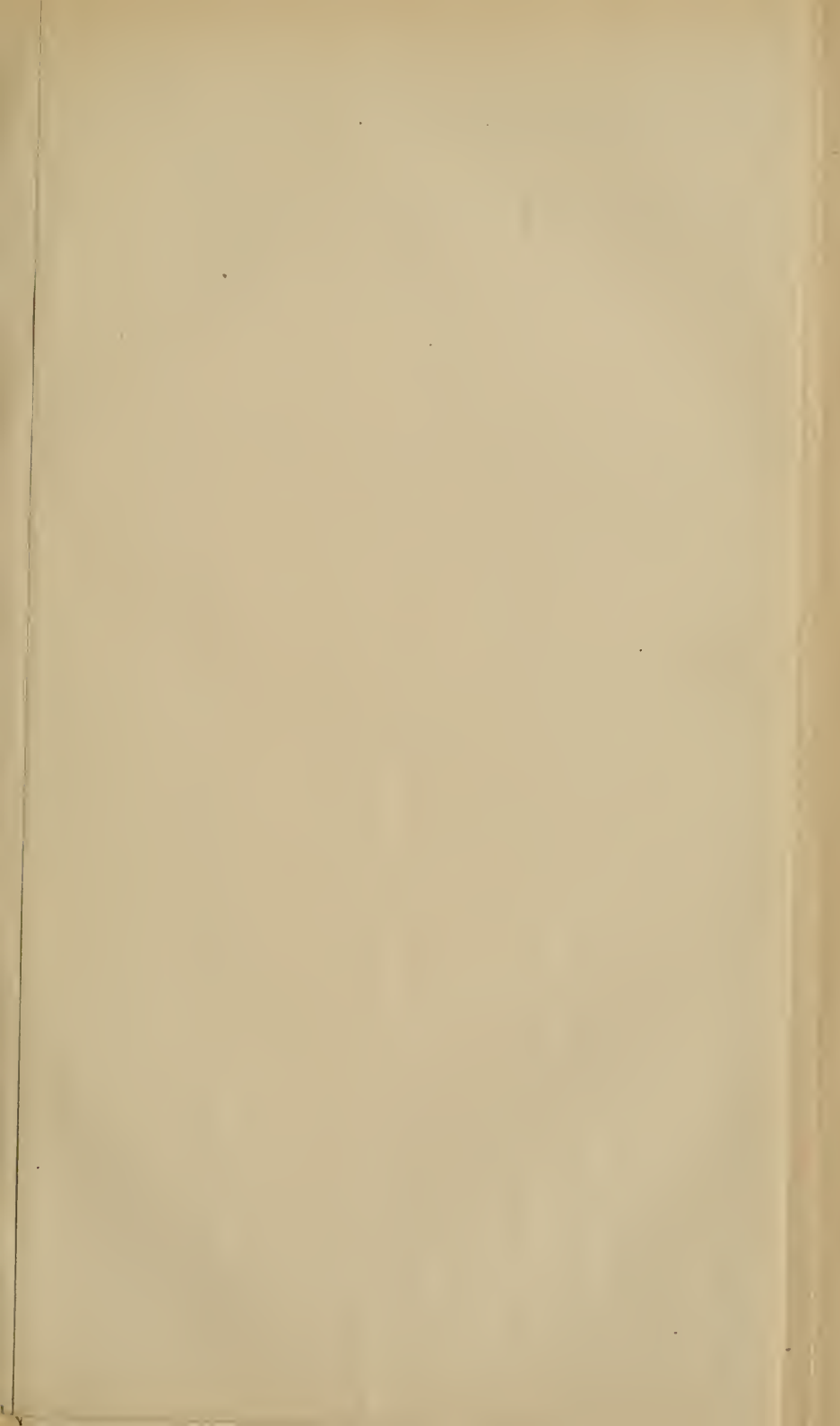
DIARRHŒA and DYSENTERY are mentioned as in sporadic form in Bakersfield, Mojave, Newcastle, Knights Ferry, Downey, Brownsville, Lockeford, Middletown, Etna Mills, Chico, Rocklin, Fresno, Pomona, Livermore, El Monte, Merced, Newman, Calico, Rio Vista, Sacramento, St. Helena, Colton, Pleasanton, Oakdale, and Mariposa.

CHOLERA MORBUS was present in a few instances in Downey, Gridley, Needles, Middletown, Fresno, Elk Grove, Ione, Chico, Livermore, and El Monte.

TABLE No. 1.

Number of Deaths, arranged according to Sexes, Months, and Ages, from June 30, 1838, to June 30, 1859.

SEXES.	MONTHS.												AGES.	Number of Months the period.	Names of Correspondents.														
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Under 1 year.	1 to 5 years.	5 to 10 years.	10 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	60 to 70 years.	Unknown.							
Localities.	Total.	Male.	Female.	Unknown.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.						
Alturas.....	16	9	6	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. M. Forrest.					
Alameda.....	16	11	12	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. T. McLean.					
Anaheim.....	23	11	12	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	Dr. J. T. Bullard.					
Anderson.....	32	17	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	Dr. Albert Enrich.					
Angels Camp.....	21	11	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	Dr. J. E. S. Baker.					
Auburn.....	28	13	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. R. E. Rowney.					
Barbersfield.....	25	13	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. C. A. Rogers.					
Benicia.....	16	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. Edw. Gray.					
Berkeley.....	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. F. H. Payne.					
Bidwell.....	18	11	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. R. Cleveland.					
Brownsville.....	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. L. C. Walker.					
Calico.....	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. A. No Kee.					
Calistoga.....	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. A. R. Rhea.					
Castroville.....	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. A. M. Gardner.					
College City.....	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. R. Greeney.					
Cotton.....	23	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. C. H. Gibbons.					
Cottonwood.....	16	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. O. Smith.					
Chester.....	19	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Drs. Markell and Callen.					
Colfax.....	20	13	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. H. N. Moor.					
Cochran.....	91	44	47	0	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	Dr. B. Woodbridge.					
Chico.....	19	7	12	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	12	Dr. Wm. King.					
Dixon.....	19	7	12	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	12	Dr. A. J. Lunt.					
Downey.....	8	5	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. A. Brown.					
Dowry.....	29	7	5	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. E. W. Bathurst.					
Elgin.....	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. T. E. Ellis.					
Elk Grove.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. Paul Ready.					
Elkton.....	10	1	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. H. L. Raynard.					
Forest Hill.....	11	2	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. Lewis Leach.					
Freemont.....	71	45	26	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	12	Dr. W. C. Jones.					
Grass Valley.....	12	2	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. C. A. E. Herdell.					
Gonzales.....	12	2	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. R. Todd.					
Grady.....	31	13	15	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	12	Dr. J. A. Davidson.					
Hanford.....	47	21	16	10	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	12	Dr. S. B. Colman.					
Headlands.....	12	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. H. Tebbetts.					
Hollister.....	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. H. Schuler.					
Igo.....	22	14	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. A. L. Adams.					
Iron.....	9	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. S. McGowan.					
John.....	14	3	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. H. Lowe.					
Knights Ferry.....	14	3	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. E. N. Foutz.					
Lakeford.....	15	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. S. Taylor.					
Livermore.....	9	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. Josiah Flint.					
Lincoln.....	16	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. L. Carpenter.					
Lakeport.....	16	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. M. A. Frazer.					
Lower Lake.....	18	6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. F. M. Loyd.					
Lodi.....	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. L. W. Knowles.					
Los Gatos.....	26	18	8	0	4	4	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. V. Colman.					
Leoma.....	69	36	28	47	36	59	47	56	69	63	57	54	51	46	87	63	105	80	38	40	86	67	63	47	12	Dr. J. W. Reese.			
Los Angeles.....	25	15	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. David Powell.				
Marysville.....	20	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. M. Millican.				
Mendocino.....	23	13	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. E. S. O'Brien.				
Merced.....	32	0	32	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. J. Kearney.				
Mariposa.....	94	52	36	6	4	7	5	8	11	11	7	15	7	6	7	6	0	2	0	5	3	4	1	22	14	63	12	Dr. M. B. Ford.	
Napa.....	53	34	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. C. D. Babo.				
Nevada City.....	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. H. V. Armistead.				
Newman.....	14	4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. Fred Hutchins.				
North Bloomfield.....	28	15	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. D. D. Crocker.				
Oakland.....	450	370	80	75	63	70	81	70	63	61	74	74	0	0	0	0	0	0	0	0	0	0	0	12	Dr. F. M. Stratton.				
Oakville.....	4	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. M. Kasper.				
Oakville.....	42	34	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. L. McAllister.				
Pasadena.....	120	68	51	11	12	12	9	8	11	8	23	0	14	14	9	0	3	4	5	8	17	8	1	25	11	11	12	Dr. J. H. Patten.	
Petaluma.....	55	29	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. J. Q. Wrenn.				
Piedmont.....	41	34	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Drs. Crank and Gardell.				
Pomona.....	63	29	34	0	7	4	2	8	7	5	7	8	4	0	2	3	8	15	9	1	2	12	6	7	5	5	1	11	Dr. John Fitch.
Red Bluff.....	32	17	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. F. P. W. Lacey.				
Red Bluff.....	32	20	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. C. A. Sherman.				
Riverside.....	82	49	33	0	2	8	11	9	8	4	5	10	5	8	8	4	1	0	0	0	0	0	0	12	Dr. A. M. Stafford.				
Rocklin.....	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. W. B. Raper.				
Roseville.....	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	Dr. H. E. Barger.				
San Francisco.....	5,729	3,624	2,105	0	619	478	425	490	562	473	517	484	479	478	456	398	1,036	308	110	169									



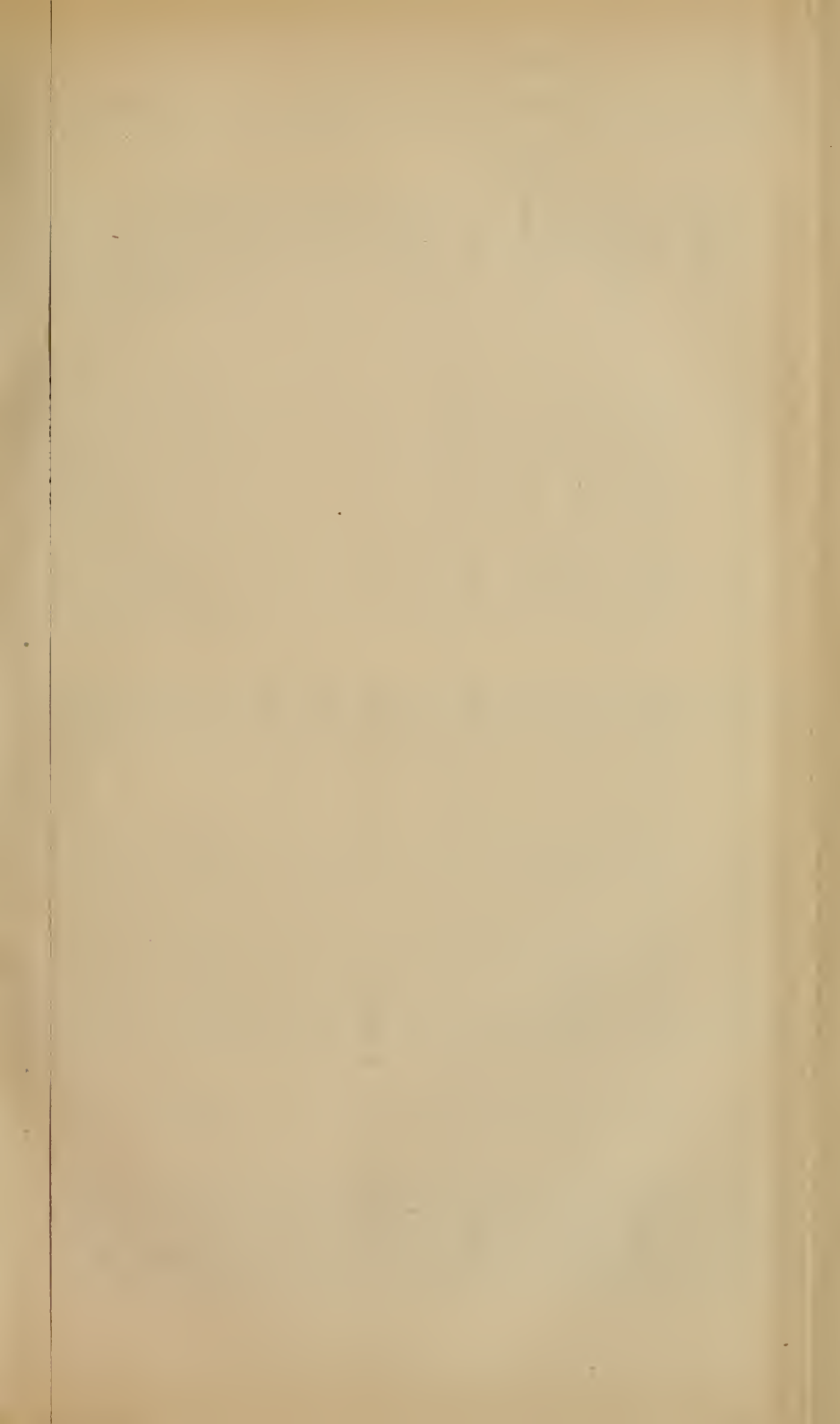


TABLE NO. 4.

Number of Deaths from all Causes, with the Sexes, Months, Ages, and Nativities, from June 30, 1888, to June 30, 1889.

DISEASES.	SEXES.		MONTHS.												AGES.										NATIVITIES.						
	Total.	Male.	Female.	Unascertained.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Under 1 year.	1 to 5 years.	5 to 10 years.	10 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	60 to 70 years.	Unascertained.	Pacific States.	Atlantic States.	Foreign.	Unascertained.	
I.—ZYMOTIC, OR EPIDEMIC.																															
Cholera morbus	17	13	3	1	2	5	1	3	1	0	0	0	1	0	1	3	4	2	0	0	0	0	1	1	4	5	6	4	4	3	
Cholera infantum	233	114	116	3	49	30	33	32	15	3	5	4	5	15	21	195	37	0	0	0	0	0	0	0	0	232	0	0	0	1	
Diarrhœa and dysentery	154	82	66	6	14	11	20	21	9	3	7	1	5	2	10	31	79	22	2	0	11	7	8	9	13	3	98	15	3	10	
Smallpox	11	7	2	2	0	0	2	1	0	0	2	0	1	0	0	0	0	1	0	1	1	3	0	1	1	3	1	3	5	2	
Measles	13	6	7	0	1	0	1	1	0	0	0	0	1	5	0	2	4	8	0	1	0	0	0	0	0	0	13	0	0	0	
Diphtheria	343	151	158	34	24	28	21	31	54	37	21	32	23	19	25	28	26	109	33	55	13	2	2	0	0	1	42	248	42	15	38
Croup	135	71	53	11	8	10	14	15	12	22	17	10	7	6	8	6	28	71	22	3	1	0	0	0	0	10	123	3	9	0	
Scarlatina	38	24	13	1	4	1	4	3	0	4	1	1	7	4	4	5	5	15	13	2	0	0	0	1	1	1	35	2	1	0	
Whooping-cough	59	26	32	1	7	6	7	4	0	4	1	7	1	4	8	11	3	45	12	0	1	0	0	0	0	1	56	1	2	0	
Erysipelas	39	25	11	3	2	4	2	4	3	3	2	7	4	4	4	4	6	4	0	2	3	3	6	7	1	1	12	7	18	2	
Fever—Typho-malarial	17	9	8	0	1	0	4	1	1	0	2	1	2	2	2	1	0	1	0	1	0	5	2	2	0	0	0	0	0	0	
Typhoid	352	202	128	22	27	45	37	33	38	29	21	18	27	21	29	4	10	28	71	129	37	31	8	12	22	100	108	111	33	33	
Malarial	98	50	40	8	9	15	17	14	14	11	8	1	0	3	5	1	15	9	4	10	21	8	8	6	4	14	39	23	24	12	
Cerebro-spinal	89	43	40	6	2	1	9	3	11	8	12	14	4	5	14	6	24	27	8	7	10	3	3	0	2	5	62	10	7	10	
Syphilis	21	13	7	1	1	1	1	0	2	1	0	2	3	1	3	5	9	0	2	0	2	1	2	1	2	2	10	6	4	1	
Alcoholism	98	69	19	10	4	12	9	11	11	11	10	10	7	1	3	6	0	0	0	0	0	12	15	20	14	17	7	31	46	14	
II.—CONSTITUTIONAL.																															
Hydrocephalus	15	6	8	1	0	0	0	2	1	2	1	1	2	3	3	1	10	1	0	1	0	1	0	1	0	1	11	1	1	2	
Meningitis	253	126	114	13	25	25	26	12	17	15	16	14	24	27	29	29	80	85	22	14	15	0	8	4	2	14	184	20	38	11	
Phthisis pulmonalis	1,727	1,023	550	154	120	116	116	147	156	147	163	164	163	142	152	141	10	10	25	125	429	357	293	166	104	208	354	451	744	198	
Marasmus	364	188	158	18	32	31	28	37	41	15	20	19	22	40	35	44	282	24	3	4	2	5	6	7	13	18	254	11	45	54	
Scrofula	2	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	
Rheumatism	34	21	12	1	1	1	2	2	1	3	6	4	2	2	1	5	0	0	0	4	4	7	6	4	7	2	6	8	19	1	
Cancer	329	139	169	21	36	23	22	20	24	22	31	26	25	33	26	41	0	0	0	4	13	20	50	87	85	32	18	81	197	33	
III.—LOCAL DISEASES.																															
Pneumonia	790	457	256	77	41	41	36	49	117	92	102	97	75	46	56	38	106	69	20	35	74	90	62	75	136	165	237	153	316	84	
Pleurisy	237	127	89	21	16	14	14	16	23	29	34	22	19	21	11	18	50	39	8	1	5	16	33	23	40	22	87	40	87	23	
Other diseases of respiratory organs	160	51	44	5	2	9	6	9	12	10	11	4	7	6	10	14	20	10	1	4	11	10	4	9	17	14	36	24	32	8	
Enteritis	156	79	72	5	11	11	16	19	10	8	7	11	9	18	15	21	97	15	3	9	7	2	5	5	8	112	15	15	15	14	
Gastritis	53	22	25	6	9	3	7	2	7	5	3	3	4	2	5	3	12	4	1	3	5	2	8	9	5	4	18	11	20	4	
Gastro-enteritis	42	21	17	4	0	2	2	4	1	9	6	3	7	3	10	5	0	0	0	5	2	2	3	5	4	21	3	4	9	9	
Peritonitis (non-puerperal)	102	36	62	4	12	7	7	5	10	10	2	6	9	13	11	10	2	4	10	11	23	12	13	7	10	32	25	30	15	15	
Diseases of the liver	173	89	65	9	11	19	16	14	16	12	19	9	18	11	11	17	4	0	1	3	18	25	42	27	30	13	16	51	91	15	
Other diseases of stomach and bowels	124	72	41	11	6	10	7	21	23	10	1	10	10	7	16	3	27	13	3	5	7	17	19	10	16	7	48	33	28	15	
Bright's disease, and nephritis	230	145	75	10	13	20	13	8	19	10	28	21	29	25	21	23	1	5	0	16	23	38	53	46	38	10	19	86	106	19	
Aneurism	26	21	2	3	5	0	1	5	0	3	0	2	2	1	3	4	0	0	0	1	5	3	11	2	4	1	1	6	15	4	
Heart diseases	795	456	285	54	62	50	58	67	71	67	71	61	83	70	81	54	8	2	14	25	62	78	127	128	279	72	92	247	373	83	
Convulsions	238	112	113	13	22	18	19	16	29	15	21	15	22	22	22	20	154	52	8	5	3	2	1	2	0	11	210	9	7	12	
Diseases of brain and nervous system	279	170	94	15	21	9	16	34	48	22	24	27	15	15	21	27	39	24	13	16	20	28	23	36	68	12	88	81	85	25	
IV.—DEVELOPMENTAL DISEASES.																															
Puerperal diseases	73	0	73	0	9	4	6	7	8	5	4	5	7	5	3	10	0	0	0	2	33	28	2	1	2	5	18	21	21	13	
Old age	205	91	98	16	14	12	21	19	29	19	22	17	14	11	15	12	0	0	0	0	0	0	0	0	0	205	0	12	69	95	29
V.—EXTERNAL CAUSES.																															
Suicide	126	106	18	2	10	10	8	15	11	6	12	6	13	12	11	12	0	0	0	7	40	27	19	9	16	8	17	42	52	15	0
Stroke	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	1	0	0	0	0	0	3	0	0	0	0
All other causes not classified	2,544	1,527	766	251	162	214	228	246	230	250	203	203	209	213	182	183	277	87	50	113	335	246	316	222	454	444	686	641	888	320	
Stillbirths	447	130	76	241	0	36	34	43	62	61	61	31	23	49	42	38	38									447					
Totals	6,149	3,991	1,064	789	841	897	964	1,126	963	979	888	965	893	958	901	1,650	776	349	567	1,333	1,126	1,253	957	1,589	1,147	4,071	2,391	3,697	1,135		

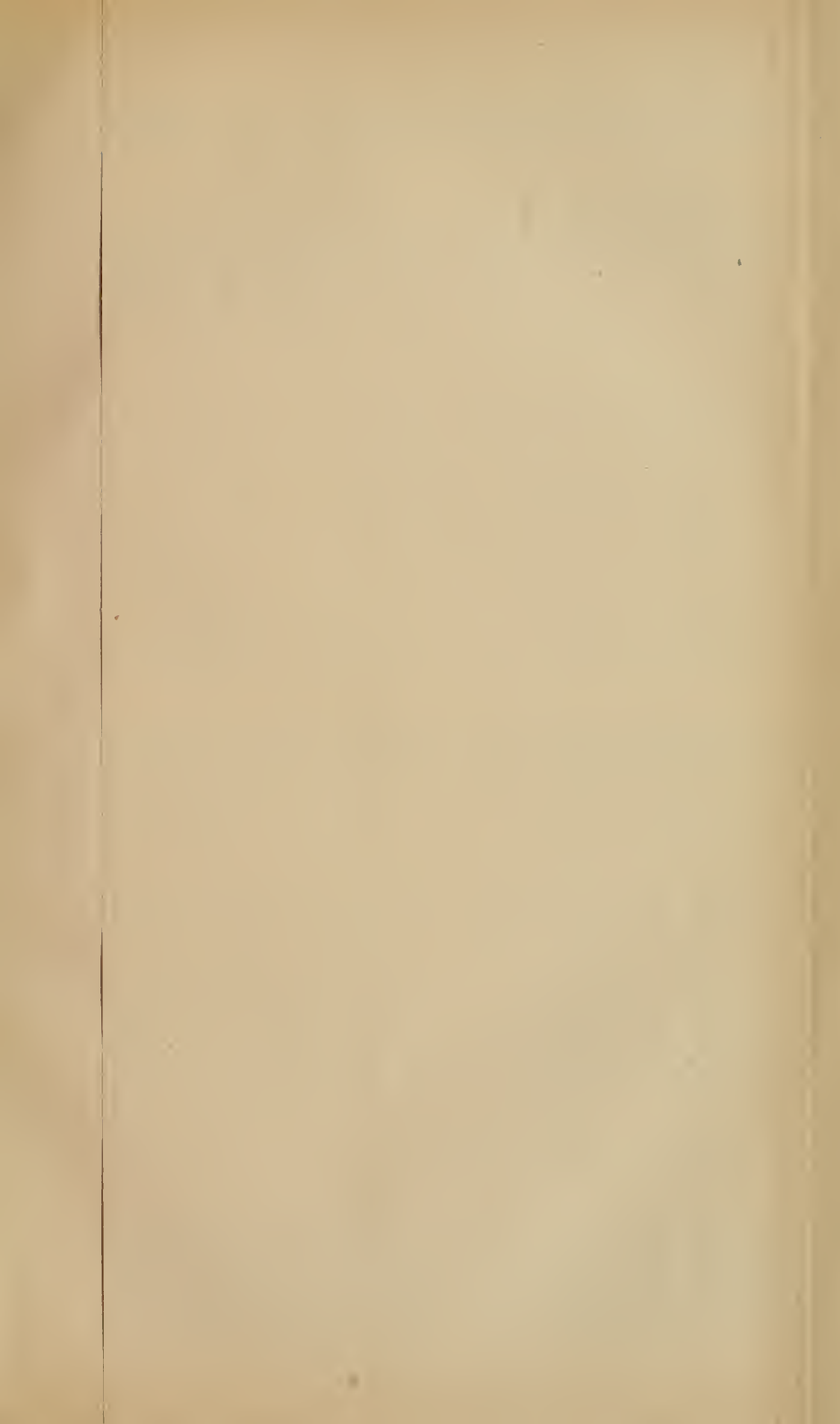


TABLE No. 5.

Number of Deaths from all Causes, with the Sexes, Months, Ages, and Nativities, from June 30, 1889, to December 31, 1889.

DISEASES.	SEXES.			MONTHS.							AGES.										NATIVITIES.			
	Total	Male	Female	Uncertained	July	August	September	October	November	December	Under 1 year	1 to 5 years	5 to 10 years	10 to 20 years	20 to 30 years	30 to 40 years	40 to 50 years	50 to 60 years	60 to 100 years	Uncertained	Pacific States	Atlantic States	Foreign	Uncertained
I.—ZYMOTIC, OR EPIDEMIC.																								
Cholera	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Cholera morbus	6	4	2	0	4	1	0	1	0	0	1	0	0	0	1	0	0	2	0	0	0	3	2	0
Cholera infantum	116	89	57	20	21	11	26	34	16	8	102	14	0	0	0	0	0	0	0	0	115	1	0	0
Diarrhœa and dysentery	86	55	29	2	14	7	20	18	14	13	41	17	1	1	5	3	4	6	8	0	63	7	15	1
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Scarlatina	15	8	7	0	1	2	3	4	4	1	1	8	3	1	1	1	0	0	0	1	13	1	1	0
Diphtheria	127	64	60	3	16	21	19	20	31	20	11	50	41	16	5	2	0	0	0	2	104	11	10	2
Croup	62	32	22	8	3	5	12	8	18	16	14	34	10	1	0	0	0	0	0	3	55	2	1	4
Influenza	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Whooping-cough	28	14	14	0	5	10	1	3	6	3	18	7	0	0	1	1	1	1	0	0	25	1	2	0
Erysipelas	19	13	6	0	2	2	1	6	5	3	2	0	1	2	2	3	4	3	0	2	5	4	8	2
Fevers—Typho-malarial	11	7	3	1	4	0	1	1	3	2	0	0	1	2	4	2	1	1	0	0	4	6	1	0
Typhoid	228	131	93	4	29	24	28	61	45	41	4	9	13	47	79	36	21	4	7	8	83	52	87	6
Remittent and intermittent	30	12	18	0	4	6	10	5	2	3	2	3	2	3	6	4	1	3	3	3	11	6	9	4
Cerebro-spinal	48	20	26	2	12	3	11	8	6	8	17	7	3	9	3	0	3	1	0	5	35	9	2	2
Syphilis	16	9	6	1	2	1	3	5	2	3	12	1	0	0	0	0	3	0	0	0	13	1	2	0
Alcoholism	57	44	11	2	22	7	10	11	2	5	0	0	0	1	4	9	14	9	12	8	4	14	34	5
II.—CONSTITUTIONAL DISEASES.																								
Hydrocephalus	6	2	2	2	0	0	1	1	3	1	4	0	0	0	1	0	0	0	0	1	5	0	0	1
Meningitis	114	57	55	2	9	24	22	20	22	17	42	26	12	2	7	5	4	7	2	7	80	16	12	6
Phthisis pulmonalis	870	562	292	16	128	139	115	149	162	177	11	6	3	68	231	217	145	91	55	43	221	239	340	70
Marasmus	259	119	138	2	48	38	46	48	42	35	215	17	3	1	4	2	2	3	8	4	236	5	13	5
Scrofula	2	1	1	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0
Rheumatism	26	12	10	4	5	6	1	5	2	7	2	1	0	4	6	2	3	4	4	0	5	10	7	4
Cancer	184	76	106	2	21	18	33	47	30	35	0	1	1	3	8	23	33	50	57	8	11	54	110	9
III.—LOCAL DISEASES.																								
Pneumonia	315	190	116	9	40	37	42	51	65	80	33	34	12	6	36	43	42	39	56	14	96	78	117	24
Pleurisy	9	8	1	0	0	2	5	1	0	3	0	0	0	0	3	0	2	1	3	0	2	1	6	0
Bronchitis	120	78	42	0	9	10	14	19	29	39	35	10	2	0	1	2	26	14	30	0	49	10	55	6
Other diseases of respiratory organs	58	42	10	6	12	4	8	12	12	10	12	7	1	7	6	3	7	7	6	2	21	11	21	5
Enteritis	80	47	33	0	13	12	13	18	13	11	59	4	1	2	1	4	1	1	7	0	51	6	21	2
Gastritis	28	18	10	0	4	0	2	7	8	7	7	0	1	0	1	5	3	2	5	4	10	2	14	2
Gastro-enteritis	19	10	8	1	4	0	3	9	2	1	7	0	0	3	2	4	1	0	0	2	13	2	3	1
Peritonitis (non-puerperal)	68	33	35	0	14	11	20	3	15	5	5	1	1	6	13	15	8	4	4	11	12	14	29	13
Diseases of the Liver	79	50	28	1	14	6	13	16	15	15	0	0	0	0	4	9	16	20	26	4	8	21	46	4
Other diseases of stomach and bowels	108	66	39	3	20	13	14	14	27	20	24	8	4	5	11	6	17	16	14	3	41	26	35	6
Bright's disease and nephritis	163	116	45	2	21	26	23	31	35	27	1	2	0	4	15	41	23	37	37	3	17	51	86	9
Anæmia	16	13	3	0	3	4	5	0	6	0	0	0	0	0	0	0	1	5	4	0	1	2	4	10
Heart disease	431	282	135	14	80	67	74	71	71	68	9	1	0	16	31	50	68	85	141	30	43	117	250	21
Convulsions	126	67	58	1	14	26	20	24	16	26	76	27	6	5	1	2	4	1	2	4	116	2	8	0
Other diseases of brain and nervous system	108	70	33	5	22	10	11	22	22	21	12	8	0	9	2	8	11	16	31	11	32	30	36	10
IV.—DEVELOPMENTAL DISEASES.																								
Puerperal diseases	19	0	19	0	4	1	2	4	6	2	0	0	0	2	7	5	4	1	0	0	6	7	4	2
Old age	107	64	40	3	18	11	19	13	22	24	0	0	0	0	7	0	0	0	107	0	9	35	47	16
V.—EXTERNAL CAUSES.																								
Snicide	82	63	19	0	13	15	15	10	20	9	0	0	2	6	23	18	15	9	5	4	14	25	36	7
Sunstroke	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All other causes not classified	1,239	796	423	80	249	210	219	255	179	187	173	52	32	51	131	122	125	136	249	228	336	320	447	196
Stillbirths	260	9	1	250	40	46	42	40	47	45										260				
Totals	5,808	3,303	2,058	447	946	837	923	1,074	1,026	1,001	954	355	157	284	656	647	614	578	889	414	2,231	1,204	1,928	445

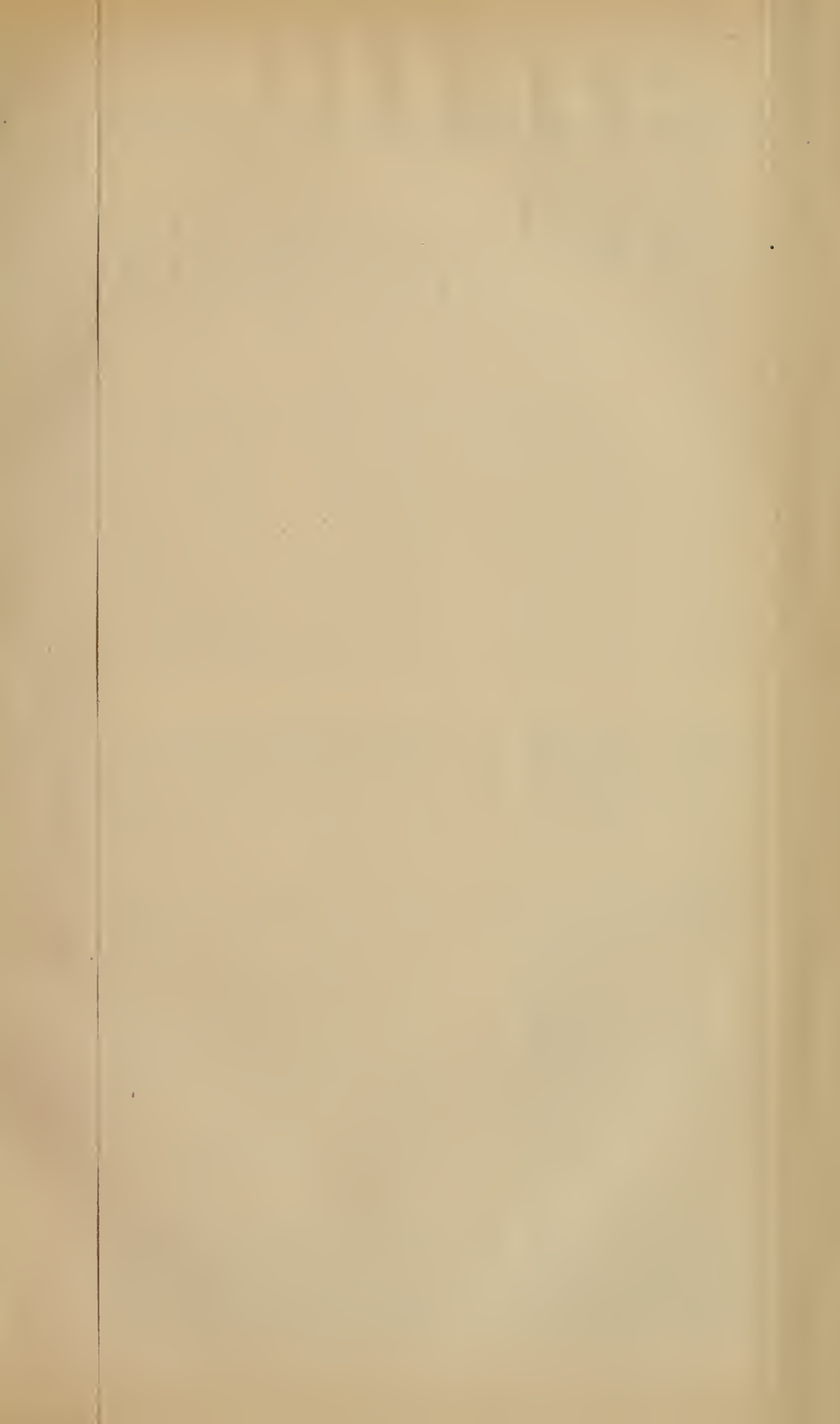


TABLE No. 6.

Number of Deaths from all Causes, with the Sexes, Months, Ages, and Nativities, from December 31, 1889, to June 30, 1890.

DISEASES.	SEXES.			Unascertained	MONTHS.						AGES.										Unascertained	NATIVITIES.			
	Total	Male	Female		January	February	March	April	May	June	Under 1 year	1 to 5 years	5 to 10 years	10 to 20 years	20 to 30 years	30 to 40 years	40 to 50 years	50 to 60 years	60 to 100 years	Unascertained		Pacific States	Atlantic States	Foreign	
I.—ZYMOTIC, OR EPIDEMIC.																									
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera morbus	3	1	1	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	
Cholera infantum	67	31	31	5	3	5	0	2	7	50	55	11	0	0	0	0	0	0	0	1	65	2	0	0	
Diarrhoea and dysentery	65	28	33	4	10	5	8	6	0	0	0	0	0	0	0	0	0	0	0	0	46	8	11	0	
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	39	17	21	1	5	3	6	14	6	5	16	16	2	2	1	0	0	0	0	2	36	1	0	2	
Scarlatina	20	8	12	0	7	1	1	3	5	3	1	11	4	3	1	0	0	0	0	0	14	3	3	0	
Diphtheria	98	48	41	9	21	9	13	17	12	26	9	49	26	8	0	2	1	0	0	3	69	7	20	2	
Croup	68	29	37	2	19	9	14	11	6	9	16	38	12	0	0	0	0	0	0	2	63	2	2	1	
Influenza	26	9	7	10	8	5	8	5	0	0	3	0	0	1	2	1	0	2	4	11	5	7	4	10	
Whooping-cough	22	6	15	1	1	7	5	3	3	3	12	9	0	0	0	0	0	0	0	1	21	0	0	1	
Erysipelas	9	8	1	0	1	2	1	2	2	1	1	0	0	0	1	2	2	0	3	0	2	0	7	0	
Fever—Typho-malarial	9	3	4	2	2	1	0	0	1	5	1	0	1	1	1	1	2	0	1	1	5	2	2	0	
Typhoid	125	71	51	3	30	21	23	19	14	18	0	8	16	26	39	12	8	4	9	3	54	38	29	4	
Remittent and intermittent	13	5	8	0	5	1	3	1	1	2	1	3	0	0	2	1	2	2	2	0	5	1	7	0	
Cerebro-spinal	55	34	17	4	10	4	12	9	6	14	14	14	7	6	6	0	1	0	2	5	36	7	8	4	
Syphilis	6	5	1	0	2	0	0	1	3	0	2	2	0	0	0	0	1	0	1	0	4	0	2	0	
Alcoholism	55	44	9	2	20	8	4	9	8	6	0	0	0	0	3	7	18	9	16	2	4	17	33	1	
II.—CONSTITUTIONAL DISEASES.																									
Hydrocephalus	11	6	4	1	1	6	0	1	0	3	7	2	0	1	0	0	0	0	0	1	10	0	0	1	
Meningitis	147	90	52	5	21	21	32	7	31	35	39	58	19	6	6	7	2	1	2	120	12	14	1	2	
Phthisis pulmonalis	1,272	842	405	25	288	252	229	170	179	154	7	13	12	106	421	286	186	103	88	50	300	361	551	60	
Marasmus	223	108	115	0	49	32	27	46	32	37	180	11	1	1	1	3	2	4	19	1	192	6	25	0	
Scrofula	2	2	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	
Rheumatism	22	8	11	3	4	2	4	1	5	6	0	0	1	3	2	0	5	4	4	3	3	9	7	3	
Cancer	208	96	104	8	35	28	41	30	49	25	0	0	1	0	11	14	46	55	74	7	8	77	114	9	
III.—LOCAL DISEASES.																									
Pneumonia	800	496	293	20	234	160	144	66	109	67	143	117	16	29	99	83	90	75	134	23	313	179	284	33	
Pleurisy	10	6	4	0	5	1	0	2	1	1	0	0	1	1	1	0	1	2	4	0	1	4	4	1	
Bronchitis	207	145	111	11	57	38	46	45	48	33	84	45	2	15	12	7	26	20	59	7	145	34	78	10	
Diseases of respiratory organs	96	59	32	5	29	12	13	14	16	12	26	4	1	3	8	7	11	10	19	7	87	18	36	5	
Enteritis	85	46	38	1	7	14	11	15	14	24	52	7	4	2	5	3	4	2	5	1	64	6	14	1	
Gastritis	30	18	12	0	8	8	2	4	5	3	6	2	2	1	0	2	3	4	10	0	12	5	13	0	
Gastro-enteritis	9	7	2	0	0	2	0	0	4	3	5	1	0	0	0	1	0	0	1	1	6	0	3	0	
Peritonitis (non-puerperal)	79	39	40	0	11	17	13	13	15	10	1	7	1	6	19	19	7	13	6	0	30	21	28	0	
Diseases of the liver	99	56	42	1	19	15	17	13	19	16	3	1	0	0	5	13	27	19	31	0	9	28	59	3	
Diseases of stomach and bowels	66	31	35	0	7	9	10	18	8	14	18	4	1	1	2	8	3	9	16	1	29	16	20	1	
Bright's disease and nephritis	179	120	56	3	33	31	40	18	28	29	4	2	2	7	10	27	40	26	56	5	28	47	35	9	
Aneurism	19	16	2	1	4	6	0	5	3	1	1	0	0	0	1	2	4	7	4	0	1	6	12	0	
Heart diseases	540	338	182	20	100	82	104	33	91	80	10	4	2	15	38	41	104	104	199	23	59	169	297	15	
Convulsions	155	85	65	5	31	20	26	21	30	27	103	32	9	3	0	2	1	0	0	5	138	6	6	5	
Other diseases of brain and nervous system	159	107	48	4	22	22	25	29	35	26	21	9	5	5	11	11	20	26	50	1	39	51	56	13	
IV.—DEVELOPMENTAL DISEASES.																									
Puerperal diseases	34	0	34	0	3	10	4	5	7	5	0	0	1	2	18	12	0	0	0	1	16	9	8	1	
Old age	157	85	64	8	32	30	27	32	19	17	0	0	0	0	0	0	0	0	157	0	10	44	92	11	
V.—EXTERNAL CAUSES.																									
Suicide	94	71	20	3	18	15	15	15	10	21	0	0	0	1	23	21	24	12	8	5	8	29	49	8	
Heat—sunstroke	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	
All other causes not classified	1,533	923	541	69	277	240	248	265	253	250	170	58	32	69	155	162	215	160	346	166	445	411	588	89	
Stillbirths	240	26	13	201	52	35	44	45	51	13										240					
Totals	7,226	4,174	2,614	438	1,492	1,191	1,220	1,094	1,155	1,074	1,044	555	181	315	915	753	873	672	1,336	342	2,695	1,644	2,582	305	

APPENDIX.

The Board of Health, while generally approving the papers presented in this report, is not responsible for the particular sentiments expressed.

BOARD OF HEALTH.

MEASLES were reported in Sausalito, Truckee, Cottonwood, Forest Hill, Alturas, Los Angeles, El Monte, Jolon, Watsonville, Sacramento, Cloverdale, and San Francisco.

SCARLET FEVER.—Isolated cases were observed in Sacramento, Rocklin, Sausalito, Ontario, Oakdale, Oakland, and El Monte.

DIPHTHERIA AND CROUP.—Few cases were reported in Sacramento, Truckee, Rocklin, Oakdale, Elk Grove, Santa Ana, Los Angeles, Long Beach, Oakland, San José, Vallejo, College City, Eureka, San Bernardino, Anaheim, Cloverdale, Martinez, and San Francisco.

WHOOPING-COUGH was noticed in Bakersfield, Sausalito, Lodi, Azusa, Colton, Napa, Oakdale, Pomona, Redding, Salinas, and Millville.

ERYSIPELAS.—Some sporadic cases of this disease were observed in Sacramento, Downey, Bakersfield, Brownsville, Lodi, Chico, Calico, Oakdale, St. Helena, College City, Redding, Newman, Eureka, Anaheim, and Shasta.

TYPHOID FEVER is mentioned in a limited number of reports this month, the cases being all sporadic. It was noticed in Sacramento, Rocklin, Newcastle, Santa Paula, Rio Vista, Livermore, Santa Ana, Los Angeles, Oakland, San Diego, El Monte, San José, Santa Barbara, and San Francisco. From this time onwards we may look for an increase in this preventable disease, as it seems impossible to educate the public up to the necessity of keeping their premises free from accumulating and decomposing filth, the air they breathe, the food they eat, and the water they drink thereby becoming contaminated and dangerous to health. Of all the sources from which typhoid fever emanates, polluted water is the most frequent. Every person drinking well water should personally see that all sources of defilement are removed from the vicinity of the well, as when the surface water evaporates and the ground water lowers, the well hole acts as a reservoir for the drainage of all fluids in its vicinity. Thus the well water becomes as dangerous to drink as any other poisonous fluid; hence we account for the increase of typhoid fever in the later months of summer, much of which is avoidable by care and assiduity in cleaning up soiled premises and removing all garbage and other filth.

TYPHO-MALARIAL FEVER, which is doubtfully distinguished from typhoid, was noticed in Igo, Knights Ferry, Chico, Pleasanton, Ione, Azusa, Los Angeles, Fresno, College City, and Nevada City.

REMITTENT FEVER was observed in Bakersfield, Igo, Knights Ferry, Brownsville, Lodi, Lockeford, Redding, Ione, Anderson, Middletown, Cottonwood, Chico, Fresno, Rio Vista, Livermore, Tulare City, and Sacramento.

CEREBRAL Fever was noticed in Suisun, Pleasanton, Chico, Berkeley, Los Angeles, Hanford, Oakland, Mendocino, Stockton, Visalia, Anaheim, and Jackson, where Dr. E. B. Robertson noticed it was accompanied by the black spots which are so characteristic of the malignant type of the disease.

PNEUMONIA.—Isolated cases of this disease were observed in Alameda, Anaheim, Chico, Eureka, Los Angeles, Oakland, Nevada City, Sacramento, Salinas, San Bernardino, Shasta, Vallejo, Napa, Etna Mills, Angels Camp, and Elsinore. In San Francisco it was quite prevalent.

BRONCHITIS, in a mild form, was quite general. It is noticed in many reports: Bakersfield, Biggs, Igo, Sausalito, Downey, Downieville, Brownsville, Lodi, Truckee, Lockeford, Sacramento, St. Helena, Oakdale, Grass Valley, Oakland, Fresno, Merced, Mojave, Ione, Benicia, Tehachapi, Salinas, and Eureka.

CHOLERA ASIATIC.—Advices have been received from the East that cholera is increasing in Spain, and as it commenced in the same province where in 1885 it carried off seventy-two thousand of its inhabitants, it is not improbable that the same lack of sanitary care will permit it to spread throughout Spain, and thence reach America through the Mediterranean or eastern imports. The disease is supposed to have originated in Valencia from opening the graves of some of the victims of the disease in 1885, and is of a virulent type. As it has been proved again and again that cholera cannot prevail where perfect cleanliness is observed, it would be a matter of simple prudence to prepare to defeat any attempted inroad of this disease into California by a general clean up of our cities, towns, and villages. Once the disease appears, this measure would be too late, and we would be left to mourn our dying and our dead, the result of our own apathy and willful neglect of a manifest duty. We cannot be sure that cholera will not come to America; we hope it will not. But with a means of prevention so easily applied, we would be criminal to neglect the warning thus timely given.

FINANCIAL STATEMENT.

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTIETH FISCAL YEAR, ENDING JUNE 30, 1889.

1888.		
Appropriation		\$1,250 00
Additional appropriation		500 00
July 2—Annals Hygiene	\$14 00	
Expressage	30	
26—Traveling expenses of Dr. C. A. Ruggles	10 40	
Traveling expenses of Dr. R. B. Cole	18 00	
Traveling expenses of Dr. James Simpson	15 00	
Traveling expenses of Dr. H. S. Orme	50 75	
Traveling expenses of Dr. J. M. Briceland	24 50	
30—Postage stamps	5 00	
Office rent	25 00	
Aug. 6—Stamps	1 00	
18—Express charges	1 65	
Engraving seal	8 00	
Traveling expenses of Drs. Tyrrell and Cluness	122 10	
28—Traveling expenses of Drs. Tyrrell and Cluness	36 60	
30—Traveling expenses of Dr. C. A. Ruggles	87 95	
31—Stamps	5 00	
Fountain pen	2 50	
Rent	25 00	
Sept. 3—Stamps	1 00	
Expressage	1 60	
Traveling expenses to Los Angeles and San Diego	95 00	
Telegraphing	4 47	
Traveling expenses of Dr. C. A. Ruggles	11 00	
14—Traveling expenses of Dr. J. M. Briceland	40 00	
Traveling expenses of Dr. Cluness	13 00	
Traveling expenses of Dr. G. G. Tyrrell	13 00	
Traveling expenses of Dr. H. S. Orme	62 00	
30—Stamps	5 00	
Office rent	25 00	
Post Office rent	2 00	
Oct. 11—Stamps	5 00	
13—Traveling expenses of Dr. C. A. Ruggles	9 40	
Traveling expenses of Dr. J. M. Briceland	25 00	
Traveling expenses of Dr. H. S. Orme	57 00	
Traveling expenses of Dr. R. B. Cole	12 50	
30—Stamps	5 00	
Office rent	25 00	
Telegraphing	3 40	
Nov. 8—Stamps	10 00	
Sanitary News	3 00	
Disinfectants	10 40	
Expressage	5 80	
21—Telegraphing	6 70	
Traveling expenses of Dr. C. A. Ruggles	11 20	
30—Office rent	25 00	
Dec. 3—Traveling expenses of Dr. G. G. Tyrrell	24 00	
11—Stamps	61 50	
18—Traveling expenses of Dr. G. G. Tyrrell	14 00	
29—Stamps	11 00	
Post Office rent	2 00	
Expressage	3 20	
31—Telegraphing	3 05	
Office rent	25 00	
1889.		
Jan. 5—Traveling expenses of Dr. H. S. Orme	50 00	
Traveling expenses of Dr. J. M. Briceland	22 50	
Traveling expenses of Dr. James Simpson	15 00	
Traveling expenses of Dr. R. B. Cole	15 00	
Traveling expenses of Dr. C. A. Ruggles	9 40	

FINANCIAL STATEMENT—Continued.

1889.			
	9—Typewriting	\$2 00	
	24—Stamps	25 00	
	30—Office rent	25 00	
Feb.	20—Traveling expenses of Dr. G. G. Tyrrell	18 80	
	28—Office rent	25 00	
Mar.	20—Sanitarian	4 50	
	28—Traveling expenses of Dr. G. G. Tyrrell	24 30	
	Postage stamps	5 00	
	Postal cards	10 00	
	American Public Health Association	5 00	
	30—Post Office rent	2 00	
	Office rent	25 00	
April 15—	Expressage	3 75	
	Traveling expenses of Dr. C. A. Ruggles	26 80	
	Traveling expenses of Dr. J. M. Briceland	50 60	
	Traveling expenses of Dr. H. S. Orme	60 25	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	Traveling expenses of Dr. W. R. Cluness	15 00	
	30—Telegraphing	65	
	Office rent	25 00	
	Stamps	10 00	
	Photographs of leprosy	14 00	
May 17—	Stamps	20 00	
	31—Office rent	25 00	
	Stamps	5 00	
June 18—	Stamps	20 00	
	30—Post Office rent	2 00	
	Office rent	25 00	
	Total	\$1,685 52	
	Balance	64 68	
	Total	\$1,750 00	\$1,750 00

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTY-FIRST FISCAL YEAR, ENDING JUNE 30, 1890.

1889.			
Appropriation			\$1,500 00
July 19—	Traveling expenses of Dr. J. M. Briceland	\$23 00	
	Traveling expenses of Dr. C. A. Ruggles	13 80	
	Traveling expenses of Dr. H. S. Orme	46 75	
	Annals Hygiene	14 10	
	Expressage	13 75	
	22—Stamps	20 00	
	27—Expressage	16 90	
	Telegraphing	1 80	
	30—Office rent	25 00	
Aug. 3—	Expressage	27 70	
	Postal cards	10 00	
	30—Office rent	25 00	
Sept. 11—	Traveling expenses of Dr. G. G. Tyrrell	8 50	
	Expressage	70	
	Stamps	10 00	
	16—Traveling expenses of Dr. C. A. Ruggles	182 10	
	30—Office rent	25 00	
Oct. 11—	Traveling expenses of Dr. J. M. Briceland	27 00	
	Traveling expenses of Dr. H. S. Orme	58 00	
	Traveling expenses of Dr. C. A. Ruggles	15 40	
	15—Postage stamps	15 00	
	Expressage	1 00	
	Telegraphing	1 65	
	30—Office rent	25 00	
Nov. 30—	Post Office rent	2 00	
	Telegraphing	2 00	
	Office rent	25 00	
Dec. 17—	Stationery	5 40	
	Expressage	2 70	
	Stamps	10 00	
	30—Office rent	25 00	

FINANCIAL STATEMENT—Continued.

1890.			
Jan.	11—Traveling expenses of Dr. C. A. Ruggles	\$14 90	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	Traveling expenses of Dr. H. S. Orme	64 00	
	18—American Public Health Association	5 00	
	Telegraphing	5 65	
	30—Office rent	25 00	
Feb.	6—Sanitary News	2 00	
	Sanitary Record	2 50	
	Sanitarian	4 00	
	21—Stamps	25 00	
	Telegraphing	50	
	Office rent	25 00	
Mar.	1—Proceedings of the Conference of Boards of Health	1 25	
	8—Expressage	2 60	
	26—Stamps	12 00	
	29—Huntington & Hopkins	3 60	
	Post Office rent	2 00	
	31—Stationery	4 65	
	Office rent	25 00	
April	3—American Public Health Association	1 40	
	8—Stamps	15 00	
	12—Traveling expenses of Dr. J. M. Briceland	23 50	
	Traveling expenses of Dr. C. A. Ruggles	15 40	
	Traveling expenses of Dr. James Simpson	15 00	
	Traveling expenses of Dr. R. B. Cole	15 00	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	30—Telegraphing	3 76	
	Office rent	25 00	
May	3—Expressage	1 15	
	Stationery and stamps	13 75	
	Stamps	10 00	
	7—Traveling expenses of Dr. G. G. Tyrrell	10 00	
	31—Office rent	25 00	
	Telegraphing	7 35	
June	9—Postal cards	15 00	
	10—Expressage	1 35	
	11—Stationery	4 80	
	20—Stamps	15 00	
	Traveling expenses of Dr. G. G. Tyrrell	25 60	
	Telegraphing	2 90	
	30—Post Office rent	2 00	
	Office rent	25 00	
Total		\$1,096 86	
Balance		403 14	
Total		\$1,500 00	\$1,500 00

EXPENSES OF THE STATE BOARD OF HEALTH ON ACCOUNT OF CONTAGIOUS AND INFECTIOUS DISEASES, FOR FORTIETH AND FORTY-FIRST FISCAL YEARS.

1888.			
Balance appropriation			\$7,493 90
Oct.	30—Traveling expenses Dr. S. S. Herrick	\$211 45	
Nov.	6—Salary Dr. S. S. Herrick, one month, six days	300 00	
Total		\$511 45	
Balance		6,982 45	
1890.			7,493 90
Balance			\$6,982 45
April	30—Expenses of C. A. Ruggles, delegate to Conference of Boards of Health	\$500 00	
May	25—Traveling expenses	250 00	
	Salary Dr. S. S. Herrick, one month	250 00	
Total		\$1,000 00	
Balance		5,982 45	
			6,982 45

NAMES AND RESIDENCES OF HEALTH OFFICERS AND CORRESPONDENTS

Of the State Board of Health for the years 1889 and 1890.

DR. J. R. DORROH	Angels Camp, Calaveras County.
DR. O. P. PAULDING	Anderson, Shasta County.
DR. R. F. ROONEY and A. S. WALDO, H. O.	Auburn, Placer County.
DR. J. H. MILLER	Azusa, Los Angeles County.
DR. J. T. McLANE	Alameda, Alameda County.
DRS. ALBERT FOUCH and C. P. PAULDING	Anderson, Shasta County.
DR. J. H. BULLARD	Anaheim, Los Angeles County.
DR. FRANK RATTAN	Antioch, Contra Costa County.
DR. J. M. FORREST	Alturas, Modoc County.
DR. C. A. ROGERS	Bakersfield, Kern County.
DR. EDWARD GRAY	Benicia, Solano County.
DR. F. H. PAYNE	Berkeley, Alameda County.
DRS. O. C. HAWKINS and W. R. CLEVELAND	Biggs, Butte County.
DR. DAVID WALKER	Bodie, Mono County.
DR. L. C. CROSSMAN	Brownsville, Sierra County.
DR. A. H. RHEA	Calico, San Bernardino County.
DR. W. KING	Chico, Butte County.
DR. M. F. PRICE	Colton, San Bernardino County.
DR. C. A. GIBBONS	College City, Colusa County.
DR. R. A. GRAY	Colusa, Colusa County.
DR. J. O. SMITH	Cottonwood, Shasta County.
DR. J. GREGORY	Castroville, Monterey County.
DRS. W. A. PATTERSON and B. WOODBRIDGE	Cedarville, Modoc County.
DR. R. S. MARKELL	Cloverdale, Sonoma County.
DR. H. N. MINER	Colfax, Placer County.
DR. Q. J. ROWLEY	Downey, Los Angeles County.
DRS. A. TRAFONT and G. H. EVANS	Dixon, Solano County.
DR. ALEMAY JUMP	Downieville, Sierra County.
DR. W. E. BATES	Davisville, Yolo County.
DR. E. W. BATHURST	Etna Mills, Siskiyou County.
DR. F. P. CAVE	El Monte, Los Angeles County.
DR. J. A. MCKEE	Elk Grove, Sacramento County.
DR. S. B. FOSTER	Eureka, Humboldt County.
DRS. T. S. ELLIS and S. H. WASHBURN	Elsinore, San Diego County.
DR. PAUL REUDY	Forest Hill, Placer County.
DR. S. J. REID	Fort Bragg, Colusa County.
DRS. G. M. KOBER, U. S. A., and RAYMOND	Fort Bidwell, Modoc County.
D. F. BATES, H. O.	Folsom, Sacramento County.
DR. T. M. HAYDEN	Fresno, Fresno County.
DR. M. M. ROWLEY	Fall River, Shasta County.
DR. A. MONTAGUE	Galt, Sacramento County.
DR. W. C. JONES	Grass Valley, Nevada County.
DR. C. A. E. HERTEL	Gonzales, Monterey County.
DRS. J. R. TODD and J. HARRIS	Gridley, Butte County.
DR. W. S. HICKMAN	Georgetown, El Dorado County.
DRS. J. G. COOPER and G. E. ALEXANDER	Haywards, Alameda County.
DR. H. V. ARMISTEAD	Hills Ferry, Stanislaus County.
DR. J. A. DAVIDSON	Hanford, Tulare County.
DR. N. B. COFFMAN	Healdsburg, Sonoma County.
DR. J. H. TEBBETTS	Hollister, San Benito County.
DR. C. F. GRANT	Hopland, Lake County.
DR. H. SCHAFER	Igo, Shasta County.
DR. A. L. ADAMS	Ione, Amador County.
DR. J. N. M. MCGOWAN	Jolon, Monterey County.
DR. E. B. ROBERTSON	Jackson, Amador County.
DR. J. H. LOWE	Knights Ferry, Stanislaus County.
DR. J. D. DAVIDSON	Kingsburg, Fresno County.
DRS. W. S. TAYLOR and W. E. KEYES	Livermore, Alameda County.
DR. G. MACGOWAN	Los Angeles, Los Angeles County.
DR. J. FLINT and A. C. FLEMMING, H. O.	Lincoln, Placer County.

DRS. L. CARPENTER and S. R. MATHER	Lakeport, Lake County.
DR. L. M. LOVELACE	Lemoore, Tulare County.
DRS. F. W. COLMAN and E. A. BURCHARD	Lodi, San Joaquin County.
DR. J. W. WOOD	Long Beach, Los Angeles County.
R. S. BURGETT, J. P.	Little Stoney, Colusa County.
DR. F. W. KNOWLES	Los Gatos, Santa Clara County.
DR. E. N. FOOTE	Lockeford, San Joaquin County.
DR. W. A. CRAIG	Lower Lake, Lake County.
DR. J. B. TENNANT	Martinez, Contra Costa County.
DR. DAVID POWELL	Marysville, Yuba County.
DR. W. MILLIKEN	Mendocino, Mendocino County.
DR. E. S. O'BRIEN	Merced, Merced County.
DR. E. V. JACOBS	Meridian, Sutter County.
DR. R. E. HARTLEY	Middletown, Lake County.
DR. T. J. STEWART	Monrovia, Los Angeles County.
DR. J. N. CRABE	Millville, Shasta County.
DRS. J. H. OSLER and W. J. WILHITE	Modesto, Stanislaus County.
DR. J. T. SURBAUGH	Madera, Fresno County.
DR. W. J. KEARNEY	Mariposa, Mariposa County.
DRS. W. E. ROBE and J. R. SUTTON	Maxwell, Colusa County.
DRS. J. P. E. HINTZ and W. FAULKNER	Monterey, Monterey County.
DR. L. F. JOHNSON	National City, San Diego County.
DR. M. B. POND	Napa, Napa County.
DRS. C. D. BOBO and F. R. WAGGONER	Nevada City, Nevada County.
DR. M. SCHNABEL	Newcastle, Placer County.
DR. G. S. FARLEY	North San Juan, Nevada County.
DRS. F. H. HUTCHINS and J. MANSON	North Bloomfield, Nevada County.
DR. J. P. BOOTH	Needles, San Bernardino County.
DR. CALLAGHAN	Nicolaus, Sutter County.
DR. D. D. CROWLEY	Oakland, Alameda County.
DR. W. THURSTON	Orland, Colusa County.
DR. J. H. M. KARSNER	Oroville, Butte County.
DR. W. E. SCOTT	Ontario, San Bernardino County.
DRS. F. W. STRATTON and R. ENDICOTT	Oakdale, Stanislaus County.
DR. L. H. PATTY	Petaluma, Sonoma County.
DRS. W. L. McALLISTER and H. SHERK	Pasadena, Los Angeles County.
DRS. J. Q. WRENN and H. W. WORTHEN	Placerville, El Dorado County.
DR. T. H. MATHER	Point Arena, Mendocino County.
DRS. A. C. SMITH and W. A. NORMAN	Plymouth, Amador County.
DR. O. S. TRIMMER	Pacific Grove, Monterey County.
DR. F. GARCELON	Pomona, Los Angeles County.
DR. W. COPE	Pleasanton, Alameda County.
DR. A. M. STAFFORD	Rocklin, Placer County.
DR. JOHN FIFE	Red Bluff, Tehama County.
DR. S. C. BROWN	Rio Vista, Solano County.
DRS. C. C. SHERMAN and W. B. SAWYER	Riverside, San Bernardino County.
DR. W. BOLTON	Roseville, Placer County.
DR. F. P. MITCHELL	Redding, Shasta County.
DR. C. A. SANBORN	Redlands, San Bernardino County.
DR. H. L. NICHOLS	Sacramento, Sacramento County.
DRS. D. E. BARGER and J. W. KEENEY	San Francisco, San Francisco County.
DR. D. GOCHENAUER	San Diego, San Diego County.
DR. E. C. RHODES	Sisson, Shasta County.
DR. R. F. WINCHESTER	Santa Barbara, Santa Barbara County.
DR. E. H. GOULD	Sonora, Tuolumne County.
DR. R. W. HILL	San Pedro, Los Angeles County.
DR. C. L. ANDERSON	Santa Cruz, Santa Cruz County.
DRS. J. CURNOW and W. SIMPSON	San José, Santa Clara County.
DRS. R. P. SMITH, JR., and H. C. CROWDER	Santa Rosa, Sonoma County.
DR. W. THORNBURG	Santa Maria, Santa Barbara County.
DR. J. R. TULLY	Sierra City, Sierra County.
DR. H. O. BRINK	Soquel, Santa Cruz County.
DR. W. J. G. DAWSON	St. Helena, Napa County.
DR. A. SAXE	Santa Clara, Santa Clara County.
DR. J. W. REYNOLDS	Suisun, Solano County.
DR. J. M. BRICELAND	Shasta, Shasta County.
DR. T. R. GOODSPEED	San Mateo, San Mateo County.
DRS. A. MILLIKEN and J. B. SPALDING	Susanville, Lassen County.
DR. H. J. CRUMPTON	Sausalito, Marin County.
DRS. J. M. LACY and J. G. BAILEY	Santa Ana, Santa Barbara County.
DR. M. F. PATTEN	Santa Paula, Ventura County.
DR. E. C. FOLSON	Santa Monica, Los Angeles County.
DR. E. E. BROWN	Selma, Fresno County.
DR. MAY GYDISON	Salinas City, Monterey County.
DRS. A. C. COLLINS and A. C. KEATING	San Bernardino, San Bernardino County.
DR. W. W. HAYES, F. O. ROBBINS, H. O.	San Luis Obispo, San Luis Obispo County.

DR. C. A. RUGGLES	Stockton, San Joaquin County.
DR. W. CURLESS	Truckee, Nevada County.
DR. A. SCHAFER	Tehachapi, Kern County.
DR. A. C. WINN	Tomales, Marin County.
DR. C. F. TAGGART	Tulare, Tulare County.
DR. H. P. TARTAR	Tehama, Tehama County.
DR. R. G. REYNOLDS	Upper Lake, Lake County.
DR. W. A. KING	Ukiah, Mendocino County.
DR. W. D. ANDERSON	Vallejo, Solano County.
DRS. T. W. PENDERGRASS and C. E. BERNHARD	Visalia, Tulare County.
DR. J. W. STITT	Vacaville, Solano County.
DR. A. J. COMSTOCK	Ventura, Ventura County.
G. E. NORMAN, H. O.	Weaverville, Trinity County.
DR. W. D. RODGERS	Watsonville, Santa Cruz County.
DR. THOS. ROSS	Woodland, Yolo County.
DR. A. W. KIMBALL	Williams, Colusa County.
DR. L. MELTON	Wheatland, Yuba County.
DR. D. N. MASON	Willits, Mendocino County.
DR. L. P. TOOLEY	Willows, Colusa County.
DR. C. L. GREGORY and A. E. PAYNE, H. O.	Yreka, Siskiyou County.

REPORT OF DEATHS

From June 30, 1888, to June 30, 1889, of those dying in the State of California.

DISEASES.	SEXES.				AGES.									NATIVITIES.				
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC, OR EPIDEMIC.																		
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera morbus	17	13	3	1	4	2	0	0	0	0	1	1	4	5	6	4	4	3
Cholera infantum	233	114	116	3	195	37	2	0	0	0	0	0	0	1	232	0	0	1
Diarrhea and dysentery	154	82	66	6	79	22	2	0	11	7	8	9	13	3	98	15	31	10
Smallpox	11	7	2	2	0	1	0	1	1	3	0	1	1	3	1	3	5	2
Measles	13	6	7	0	4	8	13	2	0	0	0	0	0	0	13	0	0	0
Scarlatina	38	24	13	1	5	15	13	2	0	0	0	1	1	1	35	2	1	0
Diphtheria	343	151	158	34	26	109	93	55	13	2	2	0	1	42	248	42	15	30
Croup	135	71	53	11	28	71	22	3	1	0	0	0	0	10	123	3	9	8
Influenza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough	59	26	32	1	45	12	0	2	1	0	0	0	0	1	56	1	2	0
Erysipelas	39	25	11	3	6	4	0	2	3	3	7	6	7	1	12	7	18	2
Fevers—Typho-malarial	17	9	8	0	1	0	1	6	5	2	2	0	0	0	7	3	5	2
Typhoid	352	202	128	22	4	10	28	71	129	37	31	8	12	22	100	108	111	33
Remittent and intermittent	98	50	40	8	15	9	4	10	21	8	8	5	4	14	39	23	24	12
Cerebro-spinal	89	43	40	6	24	27	8	7	10	3	3	0	2	5	62	10	7	10
Syphilis	21	13	7	1	9	0	2	0	2	1	2	2	1	2	10	6	4	1
Alcoholism (direct or remote), including delirium tremens	98	69	19	10	0	0	0	0	12	15	20	14	17	20	7	31	46	14
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus	15	6	8	1	10	1	0	1	0	1	0	1	0	1	11	1	1	2
Meningitis	253	126	114	13	80	85	22	14	15	9	8	4	2	14	184	20	38	11
Phthisis pulmonalis	1,727	1,023	550	154	10	10	25	125	429	357	293	166	104	208	334	451	744	198
Marasmus	364	188	158	18	282	24	3	4	2	5	6	7	13	18	254	11	45	51
Scrofula	2	2	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0

	34	21	12	1	0	0	0	0	4	4	13	4	7	6	87	4	7	83	2	6	8	19	1
Rheumatism	329	139	169	21	0	0	0	0	4	4	13	75	90	92	237	153	136	93	32	18	81	197	33
III.—LOCAL DISEASES.																							
Pneumonia	790	457	256	77	106	69	20	35	74	90	92	75	136	93	237	153	136	93	32	18	81	197	33
Pleurisy	20	15	5	0	0	1	0	1	1	1	7	5	2	1	4	4	2	1	4	4	4	11	81
Bronchitis	237	127	89	21	50	39	8	1	5	16	33	23	40	22	87	40	40	22	87	40	87	23	23
Other diseases of respiratory organs	100	51	44	5	20	10	1	4	11	10	4	9	17	14	36	24	32	8	14	36	24	32	8
Enteritis	156	79	72	5	97	15	3	9	7	2	5	5	5	8	112	15	15	8	112	15	15	14	14
Gastritis	53	22	25	6	12	4	1	3	5	2	2	8	5	4	18	11	11	4	18	11	20	4	4
Gastro-enteritis	42	21	17	4	16	5	0	0	5	2	2	3	5	4	21	3	5	4	21	3	9	9	9
Peritonitis (non-puerperal)	102	36	62	4	10	2	4	10	11	23	12	13	7	10	32	25	30	15	32	25	30	15	15
Diseases of the liver	173	99	65	9	4	0	1	3	18	25	42	37	30	13	16	51	91	15	16	51	91	15	15
Other diseases of stomach and bow- els	124	72	41	11	27	13	3	5	7	17	19	10	16	7	48	33	28	15	48	33	28	15	15
Bright's disease and nephritis	230	145	75	10	1	5	0	16	23	38	53	46	38	10	19	86	106	19	10	19	86	106	19
Aneurism	26	21	2	3	0	0	0	0	1	5	3	11	2	4	1	6	15	4	1	6	15	4	4
Heart diseases	795	456	285	54	8	2	14	25	62	78	127	128	279	72	92	247	373	83	72	92	247	373	83
Convulsions	238	112	113	13	154	52	8	5	3	2	1	2	0	11	210	9	7	12	11	210	9	7	12
Other diseases of brain and nervous system	279	170	94	15	39	24	13	16	20	28	23	36	68	12	88	81	85	25	12	88	81	85	25
IV.—DEVELOPMENTAL DISEASES.																							
Puerperal diseases	73	0	73	0	0	0	0	2	33	28	2	1	2	5	18	21	21	13	5	18	21	21	13
Old age	205	91	98	16	0	0	0	0	0	0	0	0	205	0	12	69	95	29	0	12	69	95	29
V.—EXTERNAL CAUSES.																							
Suicide	126	106	18	2	0	0	0	7	40	27	19	9	16	8	17	42	52	15	8	17	42	52	15
Heat, death from—sunstroke	3	2	1	0	1	0	0	1	1	0	0	0	0	0	3	0	0	0	0	3	0	0	0
All other causes not classified	2,544	1,527	766	251	277	87	50	113	335	246	316	222	454	444	695	641	888	320	444	695	641	888	320
Stillbirths	447	130	76	241	277	87	50	113	335	246	316	222	454	444	695	641	888	320	444	695	641	888	320
Totals	11,204	6,149	3,991	1,064	1,650	776	349	567	1,333	1,126	1,253	957	1,599	1,147	4,071	2,391	3,607	1,135	4,071	2,391	3,607	1,135	1,135

REPORT OF DEATHS

From June 30, 1889, to December 31, 1889, of those dying in the State of California.

DISEASES.	SEXES.				AGES.									NATIVITIES.			
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC, OR EPIDEMIC.																	
Cholera	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Cholera morbus	6	4	2	0	1	0	0	0	1	0	0	2	2	1	3	2	0
Cholera infantum	116	39	57	20	102	14	0	0	0	0	0	0	0	115	1	0	0
Diarrhoea and dysentery	86	55	29	2	41	17	1	1	5	3	4	6	8	63	7	15	1
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Scarlatina	15	8	7	0	1	8	3	1	1	0	0	0	0	13	1	1	0
Diphtheria	127	64	60	3	11	50	41	16	5	2	0	0	0	104	11	10	2
Croup	62	32	22	8	14	34	10	1	0	0	0	0	0	55	2	1	4
Influenza	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0
Whooping-cough	28	14	14	0	18	7	0	0	1	1	1	0	0	25	1	2	0
Erysipelas	19	13	6	0	2	0	1	2	2	3	4	3	0	5	4	8	2
Fever—Typho-malarial	11	7	3	1	0	0	1	2	4	2	1	1	0	4	6	1	0
Typhoid	228	131	93	4	4	9	13	47	79	36	21	4	7	83	52	87	6
Remittent and intermittent	30	12	18	0	2	3	2	3	6	4	1	3	3	11	6	9	4
Cerebro-spinal	48	20	26	2	17	7	3	9	3	0	3	1	0	35	9	2	2
Syphilis	16	9	6	1	12	1	0	0	0	0	3	0	0	13	1	2	0
Alcoholism (direct or remote), including delirium tremens	57	44	11	2	0	0	0	1	4	9	14	9	12	4	14	34	5
II.—CONSTITUTIONAL DISEASES.																	
Hydrocephalus	6	2	2	2	4	0	0	0	1	0	0	0	0	5	0	0	1
Tubercular meningitis	114	57	55	2	42	26	12	2	7	5	4	7	2	80	16	12	6
Phthisis pulmonalis	870	562	292	16	11	6	3	68	231	217	145	91	55	221	239	340	70
Marasmus	259	119	138	2	215	17	3	1	4	2	2	3	8	236	5	13	5
Scrofula	2	1	1	0	1	0	0	1	0	0	0	0	0	2	0	0	0

Rheumatism-----	26	12	10	4	0	1	0	4	6	2	3	3	4	4	0	5	10	7	4
Cancer-----	184	76	106	2	0	1	1	3	8	23	33	50	57	8	11	54	110	9	9
III.—LOCAL DISEASES.																			
Pneumonia-----	315	190	116	9	33	34	12	6	36	43	42	39	56	14	96	78	117	24	24
Pleurisy-----	9	8	1	0	0	0	0	0	3	0	2	1	3	0	2	1	6	0	0
Bronchitis-----	120	78	42	0	35	10	2	0	1	2	26	14	30	0	49	10	55	6	6
Other diseases of respiratory organs-----	58	42	10	6	12	7	1	7	6	3	7	7	6	2	21	11	21	5	5
Enteritis-----	80	47	33	0	59	4	1	2	1	4	1	1	7	0	51	6	21	2	2
Gastritis-----	28	18	10	0	7	0	1	0	1	5	3	2	5	4	10	2	14	2	2
Gastro-enteritis-----	19	10	8	1	7	0	0	3	2	4	1	0	0	2	13	2	3	1	1
Peritonitis (non-puerperal)-----	68	33	35	0	5	1	1	6	13	15	8	4	4	11	12	14	29	13	13
Diseases of the liver-----	79	50	28	1	0	0	0	0	4	9	16	20	26	4	8	21	46	4	4
Other diseases of stomach and bow- els-----	108	66	39	3	24	8	4	5	11	6	17	16	14	3	41	26	35	6	6
Bright's disease and nephritis-----	163	116	45	2	1	2	0	4	15	41	23	37	37	3	17	51	86	9	9
Aneurism-----	16	13	3	0	0	0	0	0	0	1	5	4	5	1	2	4	10	0	0
Heart disease-----	431	282	135	14	9	1	0	16	31	50	68	85	141	30	43	117	250	21	21
Convulsions-----	126	67	58	1	76	27	6	5	1	2	1	2	4	2	116	2	8	0	0
Other diseases of brain and nervous system-----	108	70	33	5	12	8	0	9	2	8	11	16	31	11	32	30	36	10	10
IV.—DEVELOPMENTAL DISEASES.																			
Puerperal diseases-----	19	0	19	0	0	0	0	2	7	5	4	1	0	0	6	7	4	2	2
Old age-----	107	64	40	3	0	0	0	0	0	0	0	0	107	0	9	35	47	16	16
V.—EXTERNAL CAUSES.																			
Suicide-----	82	63	19	0	0	0	2	6	23	18	15	9	5	4	14	25	36	7	7
Heat, death from--sunstroke-----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All other causes not classified-----	1,299	796	423	80	173	52	32	51	131	122	125	136	249	228	336	320	447	196	196
Stillbirths-----	260	9	1	250											260				
Totals-----	5,808	3,303	2,058	447	954	355	157	284	656	647	614	578	889	414	2,231	1,204	1,928	445	445

REPORT OF DEATHS

From December 31, 1889, to June 30, 1890, of those dying in the State of California.

DISEASES.	SEXES.				AGES.									NATIVITIES.				
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC, OR EPIDEMIC.																		
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera morbus	3	1	1	1	2	11	0	0	0	0	0	0	0	1	65	2	0	1
Cholera infantum	67	31	31	5	55	33	0	0	0	0	0	0	0	1	46	8	11	0
Diarrhoea and dysentery	65	28	33	4	33	14	0	0	5	1	2	3	7	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	39	17	21	1	16	16	2	2	1	0	0	0	0	2	36	1	0	2
Scarlatina	20	8	12	0	1	11	4	3	1	0	0	0	0	0	14	3	0	0
Diphtheria	98	48	41	9	9	49	26	8	0	2	1	0	0	3	69	7	20	2
Croup	68	29	37	2	16	38	12	0	0	0	0	0	0	2	63	2	2	1
Influenza	26	9	7	10	3	0	0	1	2	1	2	2	4	11	5	7	4	10
Whooping-cough	22	6	15	1	12	9	0	0	0	0	0	0	0	1	21	0	0	1
Erysipelas	9	8	1	0	1	0	0	0	1	2	2	0	3	0	2	0	7	0
Fever—Typho-malarial	9	3	4	2	1	0	1	1	1	1	2	0	1	1	5	2	2	0
Typhoid	125	71	51	3	0	8	16	26	39	12	8	4	9	3	54	38	29	4
Remittent and intermittent	13	5	8	0	1	3	0	0	2	1	2	2	2	0	5	1	7	0
Cerebro-spinal	55	34	17	4	14	14	7	6	6	0	1	0	1	5	36	7	8	4
Syphilis	6	5	1	0	2	2	0	0	0	0	1	0	1	0	4	0	2	0
Alcoholism (direct or remote), including delirium tremens	55	44	9	2	0	0	0	0	3	7	18	9	16	2	4	17	33	1
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus	11	6	4	1	7	2	0	1	0	0	0	0	0	1	10	0	0	1
Tubercular meningitis	147	90	52	5	39	58	19	6	6	7	7	2	1	2	120	12	14	1
Phthisis pulmonalis	1,272	842	405	25	7	13	12	106	421	286	186	103	88	50	300	361	551	60
Marasmus	223	108	115	0	180	11	1	1	1	3	2	4	19	1	192	6	25	0
Scrofula	2	2	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0

Rheumatism	22	8	11	3	0	0	0	0	0	2	0	5	4	4	3	9	7	3
Cancer	208	96	104	8	0	0	0	1	1	11	14	46	55	74	7	77	114	9
III.—LOCAL DISEASES.																		
Pneumonia	809	496	293	20	143	117	16	29	99	83	90	75	134	23	313	179	284	33
Pleurisy	10	6	4	0	0	0	1	1	1	0	1	2	4	0	1	4	4	1
Bronchitis	267	145	111	11	84	45	2	5	12	7	26	20	59	7	145	34	78	10
Other diseases of respiratory organs	96	59	32	5	26	4	1	3	8	7	11	10	19	7	37	18	36	5
Enteritis	85	46	38	1	52	7	4	2	5	3	4	2	5	1	64	6	14	1
Gastritis	30	18	12	0	6	2	2	1	0	2	3	4	10	0	12	5	13	0
Gastro-enteritis	9	7	2	0	5	1	0	0	0	1	0	0	1	1	6	0	3	0
Peritonitis (non-puerperal)	79	39	40	0	1	7	1	6	19	19	7	13	6	0	30	21	28	0
Diseases of the liver	99	56	42	1	3	1	0	0	5	13	27	19	31	0	9	28	59	3
Other diseases of stomach and bow- els	66	31	35	0	18	4	1	2	8	3	9	4	16	1	29	16	20	1
Bright's disease and nephritis	179	120	56	3	4	2	2	7	10	27	40	26	56	5	28	47	95	9
Aneurism	19	16	2	1	1	0	0	0	1	2	4	7	4	0	1	6	12	0
Heart disease	540	338	182	20	10	4	2	15	38	41	104	104	199	23	59	163	297	15
Convulsions	155	85	65	5	103	32	9	3	0	2	1	0	0	5	138	6	6	5
Other diseases of brain and nervous system	159	107	48	4	21	9	5	5	11	11	20	26	50	1	39	51	56	13
IV.—DEVELOPMENTAL DISEASES.																		
Puerperal diseases	34	0	34	0	0	0	1	2	18	12	0	0	0	1	16	9	8	1
Old age	157	85	64	8	0	0	0	0	0	0	0	0	157	0	10	44	92	11
V.—EXTERNAL CAUSES.																		
Suicide	94	71	20	3	0	0	0	1	23	21	24	12	8	5	8	29	49	8
Heat, death from—sunstroke	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
All other causes not classified	1,533	923	541	69	170	58	32	69	155	162	215	160	346	166	445	411	588	89
Stillbirths	240	26	13	201											240			
Totals	7,226	4,174	2,614	438	1,044	555	181	315	915	753	873	672	1,336	342	2,695	1,644	2,582	305

LEPROSY;

ITS EXTENT AND CONTROL, ORIGIN, AND GEOGRAPHICAL DISTRIBUTION.

By H. S. ORME, M.D., President State Board of Health.

The origin of leprosy, like the source of other specific maladies, is totally unknown. In its present form it has certainly prevailed for thousands of years—long anterior to the dawn of authentic history. The earliest description of the disease was written by the Hindoo Atreya, who is supposed to have lived two thousand years before Christ, but it is so vague and the symptoms so variable, that he may have included several different affections under the common term *Kushta*, as he attributed most of the morbid appearances to *wind*. Whatever this may mean, it is evident that both cause and symptoms were then very imperfectly understood. The same vagueness is found in the description of *tsaraath* by Moses in Leviticus, and the fact that both considered certain forms curable, indicates that several distinct pathological conditions were included under one term. Moses probably made no distinction between true leprosy and certain macular and scaly eruptions, since the weekly inspection of suspected cases would have no significance in leprosy, and the ceremonial observances of cleansing would be useless in this affection. All this is not strange when we consider that medical writers, until nearly the middle of the present century, made no clear distinction between typhus and typhoid fevers; and that, until the middle of the eighteenth century, both measles and scarlatina were included under the common term morbilli; while the Arabian physicians some centuries earlier, classed smallpox in the same category with the other two. We shall see later on that some individuals of our day regard leprosy and syphilis as variations of the same disease.

It is probable that leprosy, as we now understand it, has not been absent from the most ancient seats of civilization—China, India, and Egypt—since some undefinable period in the childhood of our race. Whether in those countries it was more or less prevalent in remote ages than now, can only be conjectured; but its history in Europe during the Christian era is so well known that we are certain of its general ravages from the twelfth to the fifteenth centuries, when it is estimated that there were as many as one thousand nine hundred lazarettos devoted to the treatment of lepers at one time in the various countries of Europe. These establishments were instituted in France in the eighth century; in Ireland, about the middle of the ninth; in Spain, at the beginning of the eleventh; in England, during the eleventh; in Scotland and the Netherlands during the twelfth, and in the following century in Norway. There is evidence of civil regulation touching lepers in Lombardy as early as the year 643, and in France in 757. The Church Council at Orleans in 549 imposed the care of lepers on the Gallic bishops, and this was confirmed by the one held at Lyons in 583. Dr. Erasmus Wilson avers that it had reached England in the

sixth century. It seems strange that leper hospitals should not have been established there for four centuries.

Since the beginning of the sixteenth century it has declined, and at the present time has mostly disappeared in that part of the world. Its introduction to Europe has been variously attributed to the arrival of the Roman Legions from eastern conquests, and the return of the Crusaders in the eleventh and twelfth centuries. It is more than probable that leprosy had gained a foothold before the Christian era, and that the returning Crusaders introduced it afresh and spread it over the land. The world's medical history during the intervening ages is exceedingly scanty and vague.

At the present time it lingers in some parts of Europe far separated from each other, and nowhere in threatening proportion. In Spain, in a lazaretto at Granada, there were fifty-three cases in 1860. Within the present decade there has been a much smaller number in a lazaretto at Barcelona. There are no legal restrictions on lepers in Spain, but it is probable that social ostracism, here, as in most parts of the world, drives them as outcasts into seclusion, and it is also probable that many small groups of lepers remain undiscovered or unmentioned in various obscure communities.*

In the *British Medical Journal* for January 12, 1889, is an account by Dr. Zuriaga, of the introduction of leprosy to the village of Porcent, province of Alicante, by a young man who came from a neighboring town in 1849 or 1850. In the family where he took up his residence, he ate, drank, and slept with another young man, who is said to have shown signs of leprosy within a year. Several relations of the latter became lepers within a few years, and the disease gradually spread to other families. Those who feared and avoided the lepers escaped. The writer states, since 1850, there have been about sixty cases in this little village, of which forty-five have already been fatal. There was no other known means of accounting for the outbreak, except the arrival and settlement of the first case in the community. It is much to be regretted that Dr. Zuriaga failed to trace the matter further back.

In the island of Samos, which has a population of forty-two thousand, there are forty-three registered lepers, but many others are known; only those in an advanced stage are isolated. The Prince of Samos has lately provided an asylum, where he proposes to gather all the lepers of the island. Fifteen are now in a monastery, where two hundred have died since 1835. The inhabitants are an uncleanly people. "The Samians consider leprosy as contagious; still the leper may go about freely and exercise the calling of a volunteer or porter in the sight and knowledge of all men, until some day he is brutally expelled to the mountains and abandoned to his fate, unless received into a monastery, where the monks accommodate them in huts a little removed from the convent." (*U. S. Mar. Hop. Weekly Abstract*, Dec. 20, 1889.) Leprosy also exists in Cyprus and probably in other Greek islands.

Dr. Dujardin-Baumetz estimates three thousand lepers in Constantinople—some in hospitals, others at large. Palestine is supposed to have about six hundred lepers. According to Dr. Max Sandreczki, of Jeru-

* Sir Morell Mackenzie, in a recent article on "The Dreadful Revival of Leprosy," sounds a loud warning note, and declares that unless prompt measures are taken, we have every prospect of seeing a great spread of this fell disease through the countries which are to-day comparatively free. The contagiousness of leprosy he considers beyond question.—*Ind. Med. Jour.*

saalem, the Moravian brothers have a hospital there, where they desire to receive all the lepers in Palestine, but the Turkish Government fails to sustain this purpose by enforced isolation. The extent of leprosy throughout the Turkish dominions must obviously be conjectural. The same is true of Greece, southern Russia, Italy, Portugal, and Iceland, in all of which countries it is believed to have limited existence. The absence of special health authorities accounts for want of precise information on the subject.

LEPROSY IN NORWAY.

In Norway, more than in any other European country, leprosy has recently been a subject of serious attention. In 1856, an attempt was made to enumerate the lepers, and to isolate the worst cases in asylums, for a scientific study of the disease and different methods of treatment. Of these, there are said to be three at Bergen, one at Moldi, and one at Drontheim. Owing to defect of legislation, the enumeration has never been complete nor isolation compulsory. Out of a population of one million five hundred thousand in 1856, it is probable that there were about three thousand lepers. Of those known, only 8 per cent were collected in hospitals during the first year, but the number has since increased to 39 per cent. Naturally the worst cases go to hospitals, and now the deaths there exceed those at home; but formerly the reverse was the case. The following table exhibits the vital movement of the leper population during the twenty-five years ending 1880:

TABLE OF ALL KNOWN LEPERS IN NORWAY, 1856-1880.

YEAR.	Total at Beginning of Year.	New Cases.	Diminution both In and Outside Asylums.			Remaining at End of Year.		Total at End of Year.
			Died.	Dis-ch'd.	Cured.	At Home.	In Asylums.	
1856						2,628	235	2,863
1857	2,863	242	293	16	2	2,367	427	2,794
1858	2,794	235	225	4	2	2,323	475	2,798
1859	2,798	249	213	8	7	2,206	523	2,819
1860	2,819	226	253	9	2	2,242	539	2,781
1861	2,781	246	238	14	4	2,060	711	2,771
1862	2,771	201	212	12	4	2,046	698	2,744
1863	2,744	189	195	6	4	1,979	749	2,728
1864	2,728	213	202	9	1	1,948	781	2,729
1865	2,729	200	205	9	5	1,938	772	2,710
1866	2,710	220	213	10	3	1,909	795	2,704
1867	2,704	185	182	7	5	1,898	787	2,685
1868	2,685	215	211	7	6	1,888	788	2,676
1869	2,676	167	200	16	8	1,832	787	2,619
1870	2,619	160	230	13	3	1,769	764	2,533
1871	2,533	153	238	16	3	1,682	747	2,429
1872	2,429	126	205	9	5	1,628	708	2,336
1873	2,336	122	177	18	8	1,583	672	2,255
1874	2,255	135	183	10	5	1,549	643	2,192
1875	2,192	123	203	14	5	1,470	623	2,093
1876	2,093	110	187	6	2	1,395	613	2,008
1877	2,008	90	165	7	3	1,294	629	1,923
1878	1,923	90	139	10	9	1,237	618	1,855
1879	1,855	39	162	11	4	1,115	602	1,717
1880	1,717	29	150	7	7	965	617	1,582

Diminution in the same ratio since that date would reduce the lepers in 1890 to about one thousand, or two thirds in thirty-five years under persuasive isolation of the worst cases. It is not improbable that the

estimate of home cases is very defective. Dr. H. V. Carter supposes that not less than five hundred cases have escaped the enumeration. If this be true, there would still be more than fifteen hundred lepers in the country. On the other hand, Dr. H. McDonald, of Leith, Scotland, who visited Norway in 1889, writes that the last return shows eight hundred and forty-six lepers in that country. The truth is probably somewhere between these wide extremes.

IN OTHER COUNTRIES.

Leprosy is averred to have existed in the Canary Islands at the date of the Spanish conquest. It does not clearly appear whether the aborigines were affected prior to the arrival of the Spaniards. Dr. Torrens, in charge of the leper hospital at Las Palmas, reports fifty-four lepers as inmates. There is no compulsory isolation, and the malady is not thought to be increasing.

According to Dr. W. A. Kynsey, leprosy was found on the island of Ceylon at the date of the Dutch occupation (about 1640), having existed from a remote period. The anæsthetic form is the most prevalent. It is believed to have increased since 1862, but this is only conjectural, as there is no registration of lepers. At that date there were sixty-three lepers in the lazaret; and in 1886 there were one hundred and fifty-one. This number by no means represents the whole of the leper population, for they resort to the asylum only when too much disabled for their usual occupations.

On the authority of Vidal, leprosy was unknown on the island of Mauritius in 1765; but this is disputed and is improbable, as there was intercourse both with the African mainland and with India. Now the cases are numbered by thousands.

It is also known to exist in Madagascar, but its extent is not ascertained. The same may be said of most countries of Africa, also Arabia and Persia.

As to leprosy in British India, A. Mackenzie, Secretary of the Indian Government, reported in 1885 to the Hawaiian Board of Health that there had been no special legislation on the subject and no enforced segregation of lepers. There are sixteen separate leper asylums, most of them sustained by public funds, wholly or partially. Whether the disease be increasing or diminishing can only be conjectured, but probably it is nearly stationary. Dr. H. V. Carter, of the Bombay army, states that it prevails in all parts of the presidency, but more upon the coast than the island, and more among the lower castes than the Brahmins. Europeans are almost exempt, and next to them the Eurasians. The anæsthetic form is far more common than the tubercular, and he does not think it shortens life greatly. An attempt has been made to enumerate the lepers of British India, but the result is manifestly imperfect. Leprosy is not recognized by the natives in an early stage, and is probably so confounded with some cutaneous affections that many cases are improperly excluded and included. Besides, the census gives nearly four and one half males to one female, which is undoubtedly erroneous. The accompanying table is therefore much too low an estimate, for according to the conjecture of some writers two hundred and fifty thousand lepers will not be far from the actual truth:

TABLE OF REGISTERED LEPEBS IN INDIA, WITH POPULATION AND RATIO.

PRESIDENCY.	Total Pop- ulation.	Total Lepers.	Ratio of Lep- ers to 10,000.
Bengal	156,201,210	98,017	6.3
Madras	31,170,631	14,525	4.7
Bombay	23,395,663	12,382	5.3
Totals	210,767,504	124,924	5.9

Leprosy exists in Siam, but more among the Chinese residents than the Siamese. There is no legal regulation over lepers, and no hospitals for their treatment.

Dr. W. H. Park supposes that there are one hundred and fifty thousand lepers in China—chiefly in the southern provinces. Dr. William Hillebrand, formerly of the Sandwich Islands, states that leprosy is not found in northern China. The authorities consign all recognized or declared lepers to special villages, where they live secluded. No healthy relatives are allowed to accompany them, but marriages among lepers are tolerated, and the children there born have to remain. The lepers in the three asylums near Canton are allowed to visit the city by day, and to receive visits. Dr. K. Yamanato stated to the Hawaiian authorities in 1883 that there are very few lepers in Japan, perhaps one in twenty thousand, or one thousand seven hundred and fifty in a population of thirty-five million. No Government hospital is provided, but there is one private establishment at Tokio. No legal segregation is declared, but lepers are secluded by social ostracism. This manifestly applies only to advanced cases, about which there could be no mistake.

The minister for the colonies of the Netherlands reports that leprosy exists in all the Dutch East Indian possessions, except the little Sunda Islands, and the northern part of Celebes. "Previous to 1865 there were local and provincial regulations enforcing separation for leprosy." In 1868 these regulations were abolished, on the ground that the disease is not contagious. In the Dutch East Indies there were fourteen asylums in 1865. Six now exist, which contain in all one hundred and eighty-nine inmates—Europeans, natives, Chinese, and Arabs. The asylums are sustained about equally by Government and by private individuals.

"Leprosy is reported to have found its way to New Caledonia, the French penal colony, and already there are hundreds of cases among the natives and convicts."—*Journal American Medical Association*, March 22, 1890.

Australia and New Zealand have recently been invaded, through Chinese immigration, but so far the subject has not attracted much attention.

"The total number of lepers under official cognizance in the Australian Colonies at the close of 1889 was thirty, there being in New South Wales, twelve (nine Chinese, one Japanese, and two whites); in Victoria, four (Chinese); in South Australia, two (Chinese); in Queensland, six (four Chinese, one Malaccan, and one from the Straits); in West Australia, one (Chinese); in Fiji, five (two Fijians, two New Hebrides, and one Solomon Island)."—*London Lancet*, May 24, 1890.

In a paper read before the Epidemiological Society of London in 1889, Dr. P. S. Abraham stated that the belief in the increase of leprosy at the Cape of Good Hope was so strong, that a repression Act had passed

in 1884. From medical reports on the subject he thought there was good foundation for this action.

IN SANDWICH ISLANDS.

The history of leprosy in the Sandwich Islands is of surpassing interest, owing to its dreadful ravages and the recent date of its recognized appearance. Its introduction has generally been charged to Chinese immigrants or coolies, and this notion is connected with the vernacular term, "mai pake," Chinese sickness.

The common agreement is that leprosy had not made much headway previous to 1860. Dr. Hillebrand avers that it was brought by the Chinese in 1848.* Dr Saxe states: "Leprosy was unknown to the natives until 1848, when it was introduced by the Chinese, and Ahia, a Chinaman, was the first leper recognized by the Hawaiian Board of Health." On this point, Dr. G. L. Fitch, who resided several years on the Islands, remarks: "As a matter of fact, Ahia was a full-blooded native, Captain of the body guard of Kamehamaha III. Still further, Ahia was a leper as early as 1840." Dr. Fitch adds that Rev. J. D. Paris, one of the early missionaries, writing in 1884, mentions a man who had been declared a leper in his presence by a physician. Mr. Paris continues: "If this was leprosy, it had existed at the Islands long before the introduction of the gospel in 1820. The first Chinamen who came here were coolies, brought in 1850 or 1851. There were no lepers, nor has there been a case of leprosy among Chinamen to my knowledge, until within the last ten years."—Pacific Medical and Surgical Journal, October, 1885.

Dr. Mouritz, resident physician at the Molokai leper settlement, adduces evidence from missionaries of the prevalence of leprosy among the natives as early as 1823. Rev. C. S. Stewart entered the following in his diary July 4, 1823: "Indeed, we seldom walk out without meeting many whose appearance of misery and disease is appalling, and some so remediless and disgusting that we are compelled to close our eyes against a sight that fills us with horror. Cases of ophthalmic scrofula and elephantiasis are common." The elephantiasis must have been leprosy, for elephantiasis arabum is acknowledged to be almost or quite absent from those islands.

Since the discovery of the Sandwich Islands in 1778, they have often been visited by ships manned by sailors from regions of the world where leprosy constantly prevails, and leprous sailors might have planted the disease by cohabitation with the native women. Besides, large numbers of Hawaiian seamen have sailed to all the shores of the Pacific and Indian Oceans, and they could easily have contracted it by intercourse with lepers abroad, and afterwards have communicated it to their countrymen at home.

One indication that leprosy is not an ancient occupant of these islands, is the fact that the majority of the cases are of the tubercular

*Dr. Emerson, President of the Board of Health of the Hawaiian Kingdom, says in his report for 1888: "Leprosy was first clearly made out to exist in this country about the year 1840, in the person of one Naea, a messenger of the chiefs, who died in 1852. The friends of Naea thought he had the disease for about ten years before his death. His case was reported by the Rev. D. D. Baldwin, M.D., of Lahaina, in a communication to the Minister of the Interior, Hon. Charles G. Hopkins, dated May 26, 1864. In 1863 Dr. Baldwin obtained, by reports from the deacons of his church at Lahaina, the names of sixty people who were supposed to be affected with the disease."

form, and formerly the preponderance was still more marked; while in India and China, where it has existed many centuries, the anæsthetic type is the prevailing one.

In 1886, of six hundred and fifty-two cases at the Molokai Settlement, three hundred and thirty-three were classed as tubercular, two hundred and four as anæsthetic, and one hundred and fifteen as mixed. The census shows leper population, March 31, 1888, at Molokai—males, four hundred and ninety-five; females, two hundred and fifty-four; total, seven hundred and forty-nine.

By 1864 leprosy had increased among the natives to such an extent that the authorities and people of intelligence became alarmed, and in 1865 a law was enacted providing for the isolation of all lepers. There has always been great difficulty in its execution, not from open resistance, but from the hiding and secretion of lepers. Several characteristics, on the amiable side of human nature, obtain to excess among these simple people, which promotes in the highest degree the spread of contagious diseases.

Christianity and civilization have failed to eradicate the indiscriminate sexual relations which have always existed, and intercourse with foreign ships' crews since 1779, the date of Captain Cook's arrival, has saturated the population with venereal diseases, so that a great many of the people of both sexes are believed to be subjects of syphilis, either inherited or acquired. Again, these people are the most friendly and sociable creatures in the world, both with strangers and each other. Persons suffering with the most loathsome diseases are not to them objects of abhorrence, but rather of benevolent attention. In their homes and in their social relations they observe the closest habits of affectionate intercourse, eating with the fingers from a common dish, passing the pipe from one mouth to another, and sleeping together indiscriminately in their small, close habitations. The race distribution of leprosy in these islands is striking. Nearly 99 per cent of the known cases have been among the native race. Though the Chinese are accused of introducing the disease, they have contributed very few to the leper population; and the President of the Board of Health in 1886 asserted that he had not known of an imported Chinese leper since the enactment of the anti-leprosy law.

The unexampled spread of leprosy in these islands, after 1870, may be attributed to several causes. There can be no doubt that the lowering of the vital stamina of the race by the great prevalence of syphilis, prepared them for the inroads of any disease that might threaten. During this period smallpox also scourged the people, and in 1868 there began a general vaccination, in which virus was taken indiscriminately from human subjects. This reckless practice doubtless contributed greatly to the spread of both syphilis and leprosy.

The following table has been compiled from the official reports of the Hawaiian Board of Health, and may be accepted as substantially correct. It is apparent that the proportion of lepers segregated, to those at large, has steadily increased from the beginning of the Act; and it is probable the total number on the islands at the present time is not far from one thousand five hundred. With strict enforcement of the law, there ought to be a marked decrease of the leper population during the present decade.

TABLE OF LEPERS AT THE MOLOKAI SETTLEMENT, HAWAIIAN ISLANDS, 1866-1886.

YEAR.	LEPERS RECEIVED.			Present January 1.	Died	Discharged	Alive in 1886	NATIONALITIES.			
	Male.	Female.	Total.					Hawaii.	White.	Chinese.	Others.
1866	103	38	141		26	10		139		2	
1867	57	13	70	105	25	7		68	1		1
1868	76	39	115	143	28	2		113	1	1	
1869	73	53	126	228	59	11		126			
1870	31	26	57	284	58	4	6	57			
1871	128	55	183	279	51	9	5	183			
1872	69	36	105	402	64	4	8	105			
1873	295	192	487	439	156	21	14	483		3	1
1874	53	38	91	749	161	8	8	90	1		
1875	128	84	212	671	163	14	16	207	3	1	1
1876	57	39	96	706	122	3	5	95	1		
1877	110	53	163	677	129	1	13	162		1	
1878	136	103	239	710	147		27	238	1		
1879	82	43	125	802	209	1	37	123	1	1	
1880	34	17	51	717	152	10	41	50	1		
1881	156	76	232	606	132		51	229	2	1	
1882	53	18	71	706	121	13	60	68	1	2	
1883	185	116	301	643	150	10	149	300		1	
1884	71	37	108	784	168	7	93	99	2	6	1
1885	75	28	103	717	142	25	96	99	1	3	
1886	16	7	23	653	20		23				
Totals.	1,988	1,111	3,099	11,021	2,283	160	652	3,034	16	22	4

Of the above there were—

Full-blooded Hawaiians	2,997
Mixed Hawaiians	37
Chinese	22
Whites	16
Other nationalities	4
Male Hawaiians, 1,903; female Hawaiians, 1,094.	

Dr. N. B. Emerson, President of the Board of Health, reported the inmates present at the Molokai Settlement January 15, 1889, as follows:

Males over ten years of age	651
Males under ten years of age	15
Females over ten years of age	360
Females under ten years of age	10
Total	1,036

Of the above there are eight Chinese and eight or ten whites (American, English, German, French, etc.). The number of lepers still at large is small and rapidly diminishing. March 31, 1888, they were estimated to be altogether six hundred and forty-four.

INTRODUCTION INTO AMERICA, ETC.

There is no apparent reason to suppose that leprosy existed in any part of the New World prior to its discovery by Columbus. At that date it prevailed throughout Europe, and followed the tide of emigration. Whether it was introduced independently from Africa is conjectural, but it has certainly been found more among the people of the African race than among all others in America. Their habits of life have always favored the propagation of spreading diseases, and leprosy has ever

found its victims chiefly among people and individuals who live in closest social relations. With the advance of civilization, the enlargement of habitations, abundance of clean garments and beds, and the use of separate table utensils, the disease has declined and nearly disappeared from the civilized world.

In British Guiana leprosy is supposed to have come with African slaves. Negro lepers were isolated, and the disease was confined to them. In 1831 they numbered four hundred and thirty-one, and were then sent to a special establishment on the river Pomeroon. Near by were several Indian tribes, all of which withdrew, except the Warrows, who associated with the lepers. In 1842 a census was taken of the Indians, and many lepers were found, but all were Warrows. In 1838 came emancipation, followed by the dispersion of the negroes and the introduction of coolies from India and China, some of whom were probably lepers. Now, two in one thousand of the population are lepers, including whites, negroes, Indians, coolies, and the mixed races.—Pacific Medical and Surgical Journal, January, 1887.

There is good reason to believe that leprosy appeared in the West Indian Islands not long after their settlement by Europeans. Dr. Hans Sloane, who was in Jamaica in 1687, mentions a case and describes native plants used in the treatment of the disease.—Professor Jones, in New Orleans Medical and Surgical Journal, March, 1878.

In Jamaica, at present there are said to be seven or eight hundred lepers—negroes and mulattoes. In Barbadoes, it is thought that the increase of lepers is four times as rapid as that of the population. On the island of Trinidad, according to Dr. W. H. Park, there were three lepers in 1805, and in 1878, about eight hundred and sixty. In the British West Indies, as in most of the other British colonies, there is no isolation of lepers.

It is quite probable that leprosy exists on most, if not all the other West India Islands, but its extent is unknown.

In the American colonies of the Netherlands, lepers are strictly segregated in Government asylums. The one in Surinam contains one hundred and two inmates, of whom, in 1883, thirty-seven were Europeans, fifty-six natives, and nine immigrants from British India. In 1884, the asylum in Curacon contained thirteen inmates; that in St. Martin, ten, and that in St. Eustatius, nineteen. Their isolation results from general belief in these colonies of the contagiousness of leprosy, which belief is not entertained in the East Indian colonies.

I have no precise information upon leprosy in other South American States, except a denial of its existence in Chili to the inquiry of the Hawaiian Government. It is said to exist in Brazil, and probably is absent from few, if any, of those countries.

Dr. Miguel Valladores, physician to the Lazaretto of Guatemala, reports to the Hawaiian Government that leprosy is almost unknown among the aboriginal Indians of pure race. His patients have all been of mixed Spanish and Indian blood. He states that lepers are strictly segregated, and that he had under his care nine men and six women. Isolation has only lately been put in force. Previously, leprosy was on the increase. The Hawaiian Consul remarks: "Well-to-do families contrive to secrete an afflicted member of the family in some remote place; this, to my personal knowledge." I have no doubt that the practice of *secreting lepers is general throughout the world*, wherever the dis-

ease prevails, and it is not difficult, in an early stage, for lepers to evade the authorities and go about their usual business. I have no particulars from other Central American States, but am disposed to believe that occasional cases of this disease might readily be found among the lowest class of people.

Dr. Gomez, Director of the Lazar Department, Juarez Hospital, Mexico, reports that leprosy, called "Mal de San Lazaro," exists principally in the western regions of the republic. During his twelve years' service, he has had no negroes under his charge, but observes no other race preferences.

The disease has been known in Mexico since the conquest, and Cortez founded a lazaret. At the present time, lepers in the City of Mexico are admitted to separate wards in a civil hospital for each sex. The average number of patients is thirty. The Superior Council of Health reported in 1886 that leprosy existed in Mexico prior to the conquest. There have been no special leper hospitals for more than twenty years, but lepers are received in civil hospitals throughout the country. In early times segregation in special hospitals was practiced. It is the belief of the Council that leprosy has decreased in Mexico in the last seventy-five years, but the fact is not accounted for. As to its ancient prevalence, may not early observers have confounded true leprosy with Elephantiasis Arabum, or Bardadoes leg?

IN BRITISH COLUMBIA.

Sporadic cases of leprosy have been recognized in British Columbia within a few years. The most notable focus of the malady at present on this continent is at Tracadie, N. B., in that portion bordering on the bay of Chaleurs and river St. Lawrence. Its origin is not precisely known. Dr. W. H. Park states that it began with a woman named Ursale Landry, in 1819. Prof. J. C. White (*Am. J. Med. Sci.*, Oct., '82) refers its source, in 1815, to a woman named Benoit, whose mother came from Normandy. As no preventive measures were used, it gradually spread among different families, but mostly among the descendants of the first case. The first leper hospital was established in 1844, and thirty-two cases were received within five years. The hospital at Tracadie was founded in 1849, and between this date and 1882, more than one hundred patients were received. None are admitted during the first year of the affliction, and very few before the third year. Belief in its contagiousness is general among the people, and plainly recognized lepers are impelled by social ostracism to go into retirement. Nearly all the cases have been of French descent. So far, no Indian has fallen a victim.

The following table exhibits the vital movement for the period 1875-85:

TABLE OF LEPERS IN THE PROVINCE OF NEW BRUNSWICK, 1875-1885.

YEAR.	IN LAZARET.		OUTSIDE.		TOTAL.		NEW CASES.		DIED.		Total
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
1875-----	13	7	6	10	20	16	1	1	2	-----	36
1876-----	10	5	7	12	17	17	1	2	3	2	34
1877-----	6	8	7	9	13	17	2	1	6	1	30
1878-----	9	8	5	7	14	15	2	2	1	3	29
1879-----	8	7	4	8	12	15	1	2	3	2	27
1880-----	6	9	5	8	11	17	1	2	2	-----	28
1881-----	8	13	5	3	13	16	2	-----	-----	1	29
1882-----	11	14	4	1	15	15	2	-----	-----	1	30
1883-----	10	12	4	1	14	13	-----	-----	1	2	27
1884-----	10	11	3	1	13	12	-----	-----	1	1	25
1885-----	11	10	2	1	13	11	-----	-----	-----	1	24

Dr. A. C. Smith, physician in charge in December, 1889, reported twenty inmates—nine males and eleven females. Two were admitted during the year, in which time there were no deaths. In September, 1889, he reported about eighteen lepers in Tracadie. It thus appears that the disease has steadily diminished since the plan of isolation was established, the apparent increase being accountable by discovery of cases previously concealed, or not recognized. As will be seen hereafter, there have been some desertions.

Professor White gives a group of eleven cases of leprosy, which were traced out in the island of Cape Breton, six of whom consisted of a woman and her five children. There was also a son-in-law and two children, and another son-in-law whose wife was not a leper, but he used to sleep with one of his leper brothers-in-law. The other case waited on one of the sons, and washed and laid him out after death.

The first case became affected in 1852, and the last in 1870. All were dead before 1882, except the last, and he was far advanced. It is worthy of notice that the mother of these children and first of the group was born on Prince Edward's Island in 1836, which island is not far from the New Brunswick seat of leprosy.

IN THE UNITED STATES.

Somewhat more than twenty-five years ago the discovery was made of the existence of leprosy among immigrants from Norway in several of the new Northwestern States of the Union. From that time to the present scattering cases have occurred, but the disease shows no tendency to spread. It is easy to trace direct connection between them and the leprous population of western Norway.

In 1863 Dr. Holmboe, of Norway, visited his countrymen in those States, and found twelve lepers among them, most of them diseased before emigrating. In no case had a native child of this country developed the disease, and it was observed to pursue a milder and more prolonged course in this country than in Norway. (Prof. J. C. White in *Am. J. M. Sci.*, Oct., 1882). It has been asserted that Norwegian lepers have been advised at home to emigrate to this country for the benefit of their health.

In 1869-70, Prof. Wm. Boeck, of Christiania, visited the Northwestern States, and found eighteen cases in Wisconsin, Iowa, and Minnesota, all from western Norway. Of these, nine were of the anæsthetic type, three tubercular, and six mixed. Four of them knew of no leprous relatives. (Report Minnesota Board of Health, 1884.) Up to 1879, twenty-six cases had been reported in Wisconsin, Iowa, Minnesota, and Nebraska, among the Norwegian and Swedish immigrants. A child of a leprous father, born in this country, was reported by Dr. Hyde in 1879, the only native leper of this group. (Dr. J. L. Babcock, New York Medical Record, September 15, 1888.) In 1886, Dr. K. Hoegh, member of the Wisconsin State Board of Health, as the result of his investigation, stated his opinion that at least one hundred and sixty Norwegian lepers (probably more) had come to this country since 1858. Norwegian records contain the names of sixty-eight. Many developed the disease after arrival, and some doubtless escaped notice. In 1886 he knew of three cases in that State.

The State Board of Health of Minnesota, in October, 1889, reported to me seven cases known in the State. Only one was isolated. All the others were able to attend to their usual business. All were Norwegians and males, thirty-five to seventy-three years old, and affected with leprosy from eleven to twenty-nine years. Five of them had developed it before emigration to this country. Two of them have healthy children. The others have no living children. Between 1868 and 1889, there had been nineteen deaths. Dr. G. A. Hansen, Surgeon of the Bergen (Norway) Leper Hospital, in a recent visit to the Northwestern States, estimates that there were only sixteen or seventeen lepers then alive.—Occi. Med. T., August, 1889.

In a book entitled "Concise Natural History of East and West Florida," published at New York, in 1876, and quoted by Prof. Joseph Jones, of New Orleans, is found a description of a disease then prevailing among the negroes, which was probably leprosy. The evidence that the malady then prevailed in the Spanish Province of Louisiana is stronger.

Gayarré, in his history of Louisiana, Vol. 3, p. 167, says: "One of the first measures of Miro's administration was one of charity. It is remarkable that leprosy, which is now so rare a disease, was then not an uncommon affliction in Louisiana. Those who were attacked with this loathsome infirmity generally congregated about New Orleans, where they obtained more abundant alms than in any other part of the colony. They naturally were objects of disgust and fear, and the unrestrained intercourse which they were permitted to have with the rest of the population, was calculated to propagate the distemper. Ullon (whose administration began in 1766) had attempted to stop this evil by confining some of the lepers at the Balize (mouth of the Mississippi River), but this measure has created great discomfort and has been abandoned. Miro now determined to act with more efficacy in this matter, and, on his recommendation, the Cabildo, or Council, caused a hospital to be erected for the reception of these unfortunate beings in the rear of the city. * * * In the course of a few years, the number of these patients gradually diminished either by death or transportation, the disease disappeared almost entirely, and the hospital went to decay."

From this time, leprosy seems to have attracted no public attention

in Louisiana until about 1879, when the State Medical Society undertook its investigation. At that date, Dr. Salomon had discovered six cases in New Orleans, and six more were reported in Vermilion Parish, near the Gulf of Mexico. This last group originated with a woman born in Louisiana, whose father came from the south of France. It does not appear that he was a leper, nor is there evidence of leprosy in the previous history of the family. This woman developed the malady in 1866, and died in 1870. In 1880, Prof. Jos. Jones, then President of the State Board of Health of Louisiana, visited the parish of La Fourche, and there found another group of twelve cases. There was strong evidence that the disease had existed for several generations. These cases in the two country parishes (counties) were all French creoles, and of the humblest class of white people. It, therefore, appears that at least eighteen lepers were found in Louisiana, in 1880, with a strong probability that a considerable additional number remained undiscovered. A report from the Louisiana Board of Health, in May, 1889, gave twelve cases in the before mentioned parish of La Fourche, three positive and three doubtful cases at St. Martinsville, and forty-two known cases at New Orleans. It is remarked: "The cases in St. Martinsville are all descendants of one man who died some years ago of leprosy, he having inherited the disease after it had skipped one generation.

The compiler of the accompanying table of cases in New Orleans, being clinical lecturer on dermatology at the medical college, and polyclinic and dermatologist to two hospitals, has had unusual opportunities for observation, of which he has fully availed himself. It is probable that hardly a case in that city has escaped his notice, and that the majority in the State have come under his eye. It is to be noted that only ten had relatives similarly affected; and Dr. Blanc remarks: "Some of the patients have had perfectly healthy children after the disease began, but the rule seems to be in females for pregnancy to end in miscarriage or in a weak, delicate child." To this it might be added that lepers generally lose the procreative function. It remains to say that there are no legal restrictions over lepers in Louisiana, and that they are received into the New Orleans Charity Hospital and placed in the ordinary surgical wards with other patients. This practice, however, has not the approval of medical men, but is adopted for want of other provision.

TABLE OF LEPERS IN NEW ORLEANS, 1889. By Dr. H. W. Blanc.

Case	Age	Nativity.	Color	Sex	Variety.	Nativity of Parents.	Duration.	Relatives with Leprosy.
1	60	Germany	Wh.	F.	Anaes.	Germany	1 yr.	
2	16	N. Orleans	Wh.	M.	Tub.		2 yrs.	
3	35	Germany	Wh.	F.	M. A.	Germany	5 yrs.*	
4	29	N. Orleans	Wh.	M.	T.		3 yrs.	
5	25	Missouri	Wh.	F.	T.		7 yrs.	
6	26	N. Orleans	Wh.	F.	M. T.	Ireland	7 yrs.	
7	26	Louisiana	Bl.	F.	T.	F., Italy; M., La.	3 yrs.	
8	75	Louisiana	Wh.	F.	M. T.		2 yrs.	
9	48	Germany	Wh.	M.	M. A.	Germany	5 mos.	
10	35	Germany	Wh.	M.	T. An.	Germany	10 yrs.	Stepmother, 2 half brothers.
11	47	Louisiana	Wh.	F.	T.		6 yrs.	
12	46	Austria	Wh.	M.	M. A.	Austria	10 yrs.	
13	27	N. Orleans	Wh.	M.	T. A.	Ireland	14 yrs.	
14	35	N. Orleans	Wh.	M.	M.		18 mos.	
15	65	Ireland	Wh.	M.	M. A.	F., Ireland		
16	10	N. Orleans	Wh.	M.	T.	Germany	5 yrs.	
17	63	Germany	Wh.	M.	A.	Germany	18 mos.	
18	27	N. Orleans	Wh.	M.	T.			Mother.
19	57	Germany	Wh.	F.	T. A.	Germany	8 yrs.†	
20	27	N. Orleans	Wh.	M.	M. A.	Ireland	18 mo.‡	
21	24	N. Orleans	Wh.	M.	A.		3 yrs.	Uncertain.
22	16	N. Orleans	Wh.	M.	T. A.	F., Ger.; M., Ire.		
23	45	N. Orleans	Wh.	F.	T.		6 yrs.	Two daughters.
24	17	N. Orleans	Wh.	F.	T.	Miss., N. O.	4 yrs.	Mother and sister.
25	15	N. Orleans	Wh.	F.	T.	Miss., N. O.	4 yrs.	Mother and sister.
26	11	Louisiana	Wh.	M.	T.		5 yrs.	
27	14	N. Orleans	Wh.	F.	M.		4 yrs.	
28	16	Louisiana	Wh.	M.	T.	Louisiana	10 yrs.	Father and several relatives.
29	15	N. Orleans	Wh.	M.	T.		5 yrs.	Brother.
30	13	N. Orleans	Wh.	M.	T.		2 yrs.	Brother.
31	51	England	Wh.	M.	T.	England	5 wks.§	
32	28	Louisiana	Bl.	M.	A.		8 yrs.	
33	54	Germany	Wh.	M.	T.	Germany	7 yrs.	
34	18	N. Orleans	Wh.	F.	T.	F., Ger.; M., N. O.	4 yrs.	
35	21	Louisiana	Bl.	M.	T.	Louisiana	over 1y	Mothersuspicious.
36	21	N. Orleans	Wh.	M.	T.	Ireland	1 yr.	
37	17	N. Orleans	Wh.	M.	T.	Germany	1 yr.	
38	36	N. Orleans	Wh.	F.	M.	F., Fran.; M., Cuba	4 mos.	
39	30	Italy	Wh.	M.	A.			
40	45	N. Orleans	Bl.	F.	A.			
41	48	France	Wh.	F.	A.			Sister.
42	19	N. Orleans	Bl.	M.	A.			

* Became leprous in La Fourche Parish.

† Washed dead body of a leper with abraded hands.

‡ Syphilitic; had often visited St. Martinsville.

§ Long syphilitic; lived at St. Martinsville in 1872, and nursed Case 5 in hospital.

|| From St. Martinsville.

|| From St. Martinsville.

Prof. Joseph Jones, of New Orleans, mentions a case of leprosy that he saw less than forty years ago among negroes on the coast of Georgia, who had been brought from Africa. The disease has probably disappeared, as there are no recent accounts of it.

Prof. J. C. White (Am. J. M. Sci., Oct., 1882) gives a table of sixteen cases, compiled by Dr. J. F. M. Geddings, of Charleston, S. C., in 1876. None occurred to his knowledge subsequent to 1876, and at that date all were known to be dead except two, whose fate was not ascertained. Of these, eleven were whites, four mulattoes, and one black. Four were Jews, one Irish, fifteen appear to have been native Americans, and the remaining negro may have been. All occurred between 1846 and 1876. Dr. Geddings remarks: "I can form no opinion as to when the disease

first made its appearance in South Carolina. * * * The first case could not in any way be connected with the old cases of the past century in the Gulf States. Both of the first cases were Jews from families coming to this country early in this century. Nor could any of the cases have had any connection with the recently imported occurrence in Louisiana, nor from African descent through slaves." With regard to connection between these cases he remarks: "The mulatto named Lazarus is said to be the son of a Jew; the others are of uncertain descent. With the exception of this case there was no special association." It is greatly to be regretted that the origin of these cases was not discovered. Dr. T. G. Simmons, of Charleston, a member of the State Board of Health, informed me in September, 1889, that there had recently been a death from leprosy in that city, and that he knew of four other cases there. Dr. W. H. Geddings, now of Aiken, S. C., but formerly of Charleston, informs me that he had a case under his care in 1884. It is not stated whether these recent cases have any connection with the above mentioned list of sixteen lepers.

I was informed by Dr. Joseph Y. Porter, Secretary of the Florida State Board of Health, in April, 1890, that two or three years ago *six cases* of leprosy existed at Key West to his knowledge. This was previous to the formation of that Board, but these unfortunate persons were cared for by their friends. As leprosy is known to exist at Havana, the Board of Health of Monroe County, Florida, has required that passengers from that city should bring certificates of exemption from this disease, signed by Dr. Burgess, Sanitary Inspector of the United States Marine Hospital Service, attached to the United States Consulate at Havana.

Dr. George H. Fox (Popular Science Monthly, April, 1884) asserts that during the last ten or fifteen years, cases of leprosy have constantly been present in the New York hospitals. Dr. R. W. Taylor (New York Medical Journal, July 13, 1889) remarks that during the past fifteen years, he has seen almost constantly one to three lepers in the crowded wards of the hospitals on Blackwell's Island, New York.

Dr. William M. Smith, Health Officer, New York City, through Dr. Cyrus Edson, Chief Inspector Sanitary Board, New York, in reply to a letter of March 16, 1890, says: "Careful investigation shows only six cases of leprosy in this city at present. Three are in public institutions, and three are isolated in their residences. During the past ten years, we have averaged about six cases present among us at all times."

Dr. Prince A. Morrow states that leprosy has gained a foothold at Salt Lake City, through Mormon converts from the Hawaiian Islands. (New York Medical Journal, July, 1889.) In confirmation, I am informed by Dr. J. M. Benedict of that city, that he has had under his care two Kanaka girls for leprosy. Both are now dead.

I learn that sixteen Chinese lepers have been shipped back home from Oregon within a few years. As to the States, etc., not heretofore mentioned, there is said to be a case of leprosy in (Province Ontario) Canada, also one in Arkansas; one has been reported in Jackson County, Mississippi; one in Indiana, and two or three in Texas. One has been returned to Europe, who desired to land at Boston, Massachusetts. Of deaths within a few years, there have been eight in Iowa, nine in Louisiana, two in Massachusetts, and nineteen in Minnesota.

CASES IN CALIFORNIA.

In California the earliest cases were Chinamen, and up to the present time the great majority have been Chinese. Owing to their migratory habits, it has been impossible to enumerate the lepers correctly. The same individuals might be observed in several different counties, if not promptly apprehended. When sufficiently advanced in the disease to be recognized, they have mostly drifted to San Francisco, and found their way to the Twenty-sixth-Street Hospital (pesthouse). The majority have been sent back to China, as they have this option. Through correspondents in most of the counties, I have been able to learn of twenty cases under their observation during, perhaps, as many years, outside of San Francisco, but some of them might also be reckoned there, after arrival from the country. Six deaths are known to have occurred outside the metropolis, but it is probable that other lepers have died of intercurrent diseases, and so have not been included. The law requires all cases to be reported by the local authorities to the Secretary of State, who is to keep a complete register of them; but no penalty is provided for neglect, and the duty has not been performed.

Most of the white lepers trace their malady to the Hawaiian Islands. I have been informed by Dr. L. L. Dorr, who was Coroner at San Francisco from 1876 to 1881, that two white lepers came under his official notice as suicides. Both had lived on the Hawaiian Islands. He adds that it has been customary there to allow white lepers to leave the country, instead of going to the Molokai Settlement. There are now three white boys, brothers, at the Twenty-sixth-Street Hospital, who contracted leprosy on the Islands. Their father lives in the city, and remains in good health.

I am specially indebted to Dr. W. F. Finnie, Resident Physician of the San Francisco City and County Hospital, for the following particulars, which he has compiled with great pains from the records of the Twenty-sixth-Street Hospital (pesthouse):

TABLE OF LEPERS IN SAN FRANCISCO, 1871-1890.

<i>Year of Admission.</i>			
1871.....	1	1881.....	2
1872.....	1	1882.....	12
1873.....	1	1883.....	11
1874.....	6	1884.....	9
1875.....	9	1885.....	7
1876.....	3	1886.....	6
1877.....	—	1887.....	3
1878.....	13	1888.....	3
1879.....	14	1889.....	12
1880.....	10	1890.....	5
<i>Nativity.</i>		<i>Color.</i>	
China.....	114	Whites.....	12
Honolulu.....	1	Mongolians.....	115
United States.....	3	Mixed.....	1
England.....	1	Total.....	128
Sweden.....	1		
France.....	1	<i>Sex.</i>	
Japan.....	1	Males.....	120
Germany.....	1	Females.....	8
Mexico.....	1		
Total.....	128	Total.....	128

TABLE OF LEPERS IN SAN FRANCISCO—Continued.

<i>Last Residence other than San Francisco.</i>		<i>Disposal of Cases.</i>	
San Quentin	1	Discharged	6
Monterey	1	Escaped	3
Honolulu	5	Died	22
Merced	1	Shipped to China	83
Sacramento	3	Not noted	1
New York	3	Remaining April 1, 1890	13
Los Angeles	2		
Petaluma	1	Total	128
St. Louis, Mo.	1		
Napa City	1		
Dutch Flat, Placer County	1		
Total	20		

TABLE OF LEPROS IN SAN FRANCISCO—Continued.

No.	NAME.	Age.	Nativity.	Occupation.	When Admitted.	When Discharged.	Remarks.
1	Hoy Tong	32	China	---	July 5, 1871	Sept. 29, 1875	Readmitted May 15, 1875.
2	Ah Choy	33	China	---	April 25, 1872	Sept. 12, 1873	
3	Ah Sue	37	China	---	April 10, 1873	Aug. 14, 1875	
4	Ah Poon	25	China	Cigarmaker	May 13, 1874	Aug. 31, 1876	
5	Ah Foy	31	China	---	June 2, 1874	July 28, 1874	
6	Ah Cue	26	China	Shoemaker	June 18, 1874	July 9, 1875	
7	Ah Lin	16	China	Cook	Nov. 5, 1874	Aug. 18, 1875	
8	Ah Yow	22	China	---	Dec. 9, 1874	Aug. 31, 1876	
9	Ah King	39	China	---	Dec. 9, 1874	June 12, 1875	
10	Ah Yin	49	China	---	Feb. 8, 1875	Aug. 31, 1876	
11	Ah Gim	25	China	---	Feb. 24, 1875	May 8, 1876	Hanged himself. Escaped from hospital.
12	Ah Yow	28	China	---	Mar. 30, 1875	Aug. 31, 1876	
13	Ah Dew	37	China	---	May 15, 1875	Aug. 31, 1876	
14	Ah Fook	25	China	---	May 15, 1875	Aug. 30, 1875	
---	Ah Foy (No. 5, supra)	33	China	---	May 15, 1875	Aug. 31, 1876	
15	Gu Fu	15	China	---	May 17, 1875	Aug. 31, 1876	
16	Ah Fook	31	China	Cook	June 5, 1875	Aug. 31, 1876	
17	Ahn Yee	42	China	Miner	Sept. 23, 1875	Aug. 31, 1876	
18	Ah Hoon	35	China	Shoemaker	Oct. 13, 1875	Aug. 31, 1876	
19	Ah Yum	26	China	Cigarmaker	Oct. 13, 1876	May 26, 1876	
20	Ah Loy	34	China	---	Feb. 18, 1876	Aug. 31, 1876	
21	Ah Leung	24	China	---	April 13, 1876	Aug. 31, 1876	
22	Ching Ling	28	China	---	July 21, 1878	June 2, 1879	
23	Nama Boo	33	China	---	Oct. 3, 1878	June 2, 1879	
24	You Gow	34	China	---	Oct. 3, 1878	June 2, 1879	
25	Ah Limb	26	China	---	Oct. 3, 1878	June 2, 1879	
26	Ah Chung	28	China	---	Oct. 3, 1878	June 2, 1879	
27	Ah Ying	30	China	---	Oct. 3, 1878	June 2, 1879	
28	Lee Fond	23	China	---	Oct. 8, 1878	June 2, 1879	
29	Ah Hong	25	China	---	Oct. 8, 1878	June 2, 1879	
30	Ah Tan	28	China	---	Oct. 8, 1878	June 2, 1879	
31	Ah Sam	32	China	---	Oct. 9, 1878	June 2, 1879	
32	Ah Fond	26	China	---	Oct. 9, 1878	June 2, 1879	
33	Tong Wa	20	China	---	Nov. 20, 1878	June 2, 1879	
34	Ah Sin	25	China	---	Dec. 8, 1878	June 2, 1879	
35	Ah Yung	36	China	---	Feb. 19, 1879	June 2, 1879	
36	Ah Wand	30	China	---	April 30, 1879	Sept. 23, 1879	
37	Ah Wan	34	China	---	April 30, 1879	Nov. 20, 1878	
38	Ah Cow	25	China	---	June 17, 1879	Dec. 21, 1880	

39	Sam Sing	China	June 25, 1879	Dec. 21, 1880	-----
40	Ah Wah	China	June 27, 1879	Nov. 25, 1879	-----
41	Lin Duck	China	July 28, 1879	Mar. 20, 1880	-----
42	Ah Lay	China	July 28, 1879	Dec. 21, 1880	-----
43	Ah Chung	China	July 28, 1879	Dec. 21, 1880	-----
44	Ah Toy	China	July 28, 1879	Dec. 21, 1880	-----
45	Ah Kee	China	July 28, 1879	Dec. 21, 1880	-----
46	Ah Quie	China	Aug. 1, 1879	Dec. 21, 1880	-----
47	Sing Lang	China	Oct. 2, 1879	Mar. 22, 1880	-----
48	Ah Gong	China	Jan. 20, 1880	Dec. 21, 1880	-----
49	Ah You	China	Feb. 17, 1880	Dec. 21, 1880	-----
50	Ah Leen	China	Mar. 1, 1880	Dec. 21, 1880	-----
51	Lang Goo?	England	Mar. 4, 1880	Nov. 4, 1881	-----
52	Thomas Stanton	China	Mar. 8, 1880	Dec. 19, 1880	-----
53	Wan Lung	China	April 19, 1880	Dec. 19, 1880	-----
54	Ah Chue	China	April 22, 1880	June 14, 1880	-----
55	Ah Wan	China	May 6, 1880	Dec. 19, 1880	-----
56	Ah Lone	China	July 7, 1880	Nov. 30, 1880	-----
57	Ah Pack?	China	Aug. 2, 1881	Dec. 19, 1880	-----
58	Ah Sin?	China	July 14, 1881	Nov. 30, 1880	-----
59	Ye Mug Tou	China	Dec. 2, 1881	Aug. 7, 1884	-----
60	He Hup	China	Mar. 27, 1882	Aug. 7, 1884	-----
61	Ah Sue	China	Mar. 27, 1882	Aug. 7, 1884	-----
62	Ah Chue	China	Mar. 27, 1882	Aug. 7, 1884	-----
63	Ah Wan	China	Mar. 27, 1882	Aug. 7, 1884	-----
64	Ah He	China	Mar. 31, 1882	July 15, 1882	-----
65	Ah Sock	China	April 1, 1882	Aug. 7, 1884	-----
66	Charles Lacy	China	May 8, 1882	May 29, 1882	-----
67	Ah Shue	China	July 1, 1882	Aug. 7, 1884	-----
68	Ah Yet	China	July 1, 1882	Sept. 30, 1883	-----
69	Ah Yick	China	Aug. 20, 1882	Aug. 7, 1884	-----
70	Ah Sing	China	Nov. 6, 1882	Feb. 28, 1883	-----
71	Ah Chung	China	Nov. 7, 1882	Aug. 7, 1884	-----
72	Ah Young	China	Nov. 8, 1882	June 22, 1883	-----
73	Ah Gruie	China	Jan. 4, 1883	Aug. 7, 1884	-----
74	Ah Nos	China	Jan. 9, 1883	July 10, 1883	-----
75	Ah Cow	China	Jan. 13, 1883	July 7, 1884	-----
76	Sing Lah	China	Jan. 13, 1883	Aug. 7, 1884	-----
77	Ah Nay	China	Jan. 13, 1883	July 10, 1883	-----
78	Che Oune	China	April 30, 1883	Aug. 7, 1884	-----
79	Marie Nicholas	Honolulu	Sept. 17, 1883	Aug. 7, 1884	-----
80	Ah Ling	Sweden	Oct. 6, 1883	Aug. 7, 1884	-----
81	Eric Erickson	Sweden	July 13, 1883	July 15, 1884	-----
82	Hun Yee	Sweden	Nov. 23, 1883	Aug. 7, 1884	-----
83	Ah Lee	Sweden	Nov. 23, 1883	Aug. 7, 1884	-----

----- Taken by friends for shipment.
----- Left hospital.

----- Strangled by meat in trachea.

----- Shipped by friends on Belgic, Dec. 21, 1880.
----- Shipped by friends on Belgic, Dec. 21, 1880.
----- Taken by friends for shipment.
----- Shipped by friends (Belgic?).

----- Shipped by friends (Belgic?).
----- Lost use of hands two years before entrance.
----- Diseased for two years.

----- Diseased for two years.
----- Fifteen years in California.

----- Escaped from hospital.
----- Suicided by opium.

----- Admitted with psora-lepra.
----- Shipped by friends.
----- Shipped by friends.
----- Shipped by friends.

----- Died of smallpox.

TABLE OF LEPERS IN SAN FRANCISCO—Continued.

No.	NAME.	Age.	Nativity.	Occupation.	When Admitted.	When Discharged.	Remarks.
84	Ah Yon.	27	-----	Weaver	Feb. 21, 1884.	Aug. 7, 1884.	-----
85	Ah Joek	46	-----	-----	Feb. 25, 1884.	Aug. 7, 1884.	-----
86	Ah Quin	25	-----	Gardener	Mar. 31, 1884.	Aug. 7, 1884.	-----
87	Nick Horne	37	-----	Hoppicker	April 27, 1884.	Aug. 7, 1884.	-----
88	Ah Ling	36	-----	Laundryman	May 10, 1884.	Aug. 7, 1884.	-----
89	Ah Yin	37	-----	Cook	July 10, 1884.	July 10, 1884.	-----
90	Ah Shain	30	-----	Cook	July 10, 1884.	Aug. 7, 1884.	-----
91	Ah Done	34	-----	Cook	July 23, 1884.	Aug. 7, 1884.	-----
92	Wong Tick	22	-----	Laundryman	Nov. 11, 1884.	June 27, 1885.	-----
93	Ah Wong	26	-----	Cook	Jan. 7, 1885.	June 27, 1885.	-----
94	Quong Wah	-----	-----	-----	Jan. 7, 1885.	June 27, 1885.	-----
95	Loi Young	22	-----	-----	Mar. 7, 1885.	June 27, 1885.	-----
96	Ah Lui	24	-----	-----	Mar. 31, 1885.	June 27, 1885.	-----
97	Yee Fo	26	-----	Merchant	April 2, 1885.	July 9, 1885.	-----
98	Daniel Higgins	64	Connecticut	Laborer	April 16, 1885.	Mar. 7, 1885.	-----
99	Long Hong	32	-----	Cigarmaker	Mar. 22, 1885.	June 27, 1885.	-----
100	Ah Gip	26	-----	-----	April 8, 1886.	April 12, 1886.	-----
101	Wong Joe San	43	-----	-----	April 27, 1886.	May 8, 1886.	-----
102	Edw. T. Bindt	16	Honolulu	-----	May 12, 1886.	-----	-----
103	Frank Bindt	17	Honolulu	-----	Aug. 28, 1886.	-----	-----
104	Ernest Bindt	14	Honolulu	-----	Aug. 28, 1886.	-----	-----
105	Goon How	31	-----	Laundryman	Nov. 5, 1886.	Dec. 1, 1886.	-----
106	Clark F. Blackmer	39	Massachusetts	Teamster	Feb. 23, 1887.	Aug. 18, 1887.	-----
107	Chas. M. Stillwell	56	Philadelphia, Pa.	Laborer	Oct. 13, 1887.	July 7, 1888.	-----
108	Charley Ah Wee	24	Japan	-----	Oct. 14, 1887.	June 1, 1888.	-----
109	Tankichi Yontaka	28	-----	-----	Mar. 10, 1888.	April 12, 1888.	-----
110	Young Ah You	37	-----	-----	Sept. 25, 1888.	Oct. 29, 1889.	-----
111	Chung Ah Fook	29	-----	-----	Sept. 25, 1888.	Mar. 2, 1889.	-----
112	Ah Hung (No. 1)	35	-----	Coal miner	Sept. 25, 1888.	Oct. 29, 1889.	-----
113	Ah Gum	35	-----	Housewife	Jan. 31, 1889.	Oct. 29, 1889.	-----
114	Ah Hin	55	-----	Laborer	Mar. 15, 1889.	Sept. 25, 1889.	-----
115	Matthew Perrin	67	France	Tailor	April 19, 1889.	Oct. 2, 1889.	-----
116	See Tong Tai	35	-----	Laundryman	July 2, 1889.	Sept. 5, 1889.	-----
117	Ah Loue	38	-----	-----	Aug. 21, 1889.	Oct. 29, 1889.	-----
118	Ah Hung (No. 2)	35	-----	Cook	Sept. 18, 1889.	Oct. 29, 1889.	-----
119	Chin Tun	26	-----	Cook	Sept. 25, 1889.	Oct. 29, 1889.	-----
120	Dietrick Hummalback	41	Germany	Carpenter	Oct. 4, 1889.	Oct. 29, 1889.	-----
121	Sing Ah Low	29	-----	Laundryman	Oct. 14, 1889.	Mar. 14, 1890.	-----
122	Yee Ah Quong	26	-----	-----	Nov. 27, 1889.	-----	-----
-----	Charley Ah Wee	26	-----	-----	Nov. 27, 1889.	-----	-----

See No. 108.

123	Wong Pack Chung	21	Honolulu	Clerk	Dec. 31, 1889		
124	Wm. Horn	27		Cigarmaker	Feb. 13, 1890		
125	Ah Po	42		Teamster	Feb. 16, 1890		
126	Clark F. Blackmer	14	Massachusetts	Bootblack	Feb. 27, 1890		
127	Peter Benada	50	Acapulco, Mex.	Miner	Mar. 1, 1890		See No. 106.
128	Yee Ah Yeng	29		Ranch cook	Mar. 24, 1890		
	Cheung Ah Soon				Mar. 26, 1890		

Of those deceased, three were suicides, one died of accidental suffocation, and one of smallpox.

It is curious that the records of the City and County Hospital give, from 1871 to 1876, inclusive, fifty-seven cases of syphilis, with sixteen deaths; while from 1882 to 1890 there were forty cases and no deaths. Dr. Finnie reasonably presumes that all, or nearly all, of the sixteen fatal cases were leprosy.

CASUAL OR SPORADIC CASES.

These occasionally turn up most unexpectedly in places where leprosy has always been unknown or rarely observed. They are a puzzle to the medical men and a wonder to the laity. It is probable that they often pass without recognition, for the great majority of physicians are strangers to the disease and would mistake it for something else. The ordinary sources of medical information furnish the following: In England most of them have previously resided in India or the colonies where leprosy prevails. In 1873 Dr. F. E. Anstie presented a case to the Clinical Society of London, a man twenty-nine years old, who had resided eleven years in India. Three others had previously come under his notice. The same year Dr. Tilbury Fox reported a girl ten years old, who was believed to have contracted leprosy from her wet nurse. The first symptoms appeared when she was between two and three years of age. In 1853 a tailor, native of Ireland, died of leprosy at Guy's Hospital, London, after an illness of eight years. He was never out of the British Isles.—*Med. Chir. Trans.*, 1860.

In 1872 an Irish leper was shown to the Dublin Medical Society, who had contracted the disease in India. For a year and a half this man's brother, who had only left Ireland for a visit to England forty-six years before, slept in the same bed and wore his clothing. He became a leper and was presented to the same society. There were no other lepers in the family.—*Report Dr. Lee in Nat. Conf. S. B. of H.*, 1888.

Cases occasionally present themselves at hospitals in Boston, Philadelphia, Baltimore, and other cities. They are mostly sailors or persons who have lived abroad. A case of leprosy developed in the almshouse of Salem, Massachusetts, in the person of a man named Charles Derby, lately from San Francisco. He had lived some years at Honolulu, as chief botanist to Queen Emma.—*Medical News*, December 23, 1882.

In 1889, Dr. P. S. Abraham presented two cases to the Epidemiological Society of London, one tubercular, the other anæsthetic. The latter was a native of London, sixty-four years old, who had been a sailor in the Mediterranean and Baltic, but for the last forty years had not been out of London. He was a meat salesman. Dr. Abraham thought the period of incubation must have been nearly forty years. He also alluded to a recent case brought to notice in Dublin.

In 1889, Dr. Geo. Dock reported to the Texas State Medical Society two cases of leprosy, of tubercular type, one of eight and the other of five years' standing; one a native of Germany, the other of Alsace; one a harness and mattress maker, the other employed in a cotton press. Both had resided at Galveston more than twenty years, and Dr. Dock was unable to trace the cause either through heredity or contagion.

Professor White, of Boston, states that one of the Tracadie cases escaped about 1857, and was for a considerable time at Boston, under

an assumed name. There he was under the doctor's charge for months, at the Massachusetts General Hospital. A leper from Louisiana, under a feigned name, lived near Boston, and came under his care in 1882. He adds that another Tracadie case has been known at Boston, and one in 1882 was discovered at Providence and returned to Tracadie.

In 1888 a leper, in company with another Chinaman, boarded a train at Ogden. His case was recognized by a physician, who happened to be aboard, and the Division Superintendent of the Central Pacific Railroad was notified; but he refused to have the leper removed from the train, and he was brought to San Francisco.

The State Board of Health of Missouri, in 1889, reported the discovery of a case in June, 1888. He had lived at New Orleans most of the time from 1866 to 1879, and leprosy developed in 1881. He was removed to the quarantine hospital at St. Louis.

In September, 1888, two Chinese lepers traveled from Los Angeles to San Francisco, having been sent by their countrymen without knowledge of the authorities. On arrival at San Francisco they were recognized as lepers and sent to the Twenty-sixth-Street Hospital.*

Late in 1889, two Chinese lepers traveled by rail from New York to San Francisco. One came with a certificate to the Health Officer at San Francisco, that he was affected with leprosy, and a request that "good care be taken of him." †

The Occidental Medical Times of July 1, 1889, gives the case of a leper committed to the Sacramento County Jail, in an advanced stage of leprosy. He was pardoned by the Governor, so that he might be sent to the Twenty-sixth-Street Hospital at San Francisco.

Dr. David Powell, of Marysville, Yuba County, California, kindly reports to me the case of a mulatto barber of that place, aged sixty, who committed suicide in 1888, on discovering himself to be a leper. He was a native of Virginia, and had not been away from Marysville for twenty-five years. Symptoms of leprosy appeared in 1884, but he continued to work at his trade long after. Dr. C. E. Stone, President of the local Board of Health, surmises that he might have contracted the disease from Chinese women.

Dr. F. B. Sutliff, of Sacramento, informed me about a year ago that three cases of leprosy had come under his personal observation in his own community, all of the tubercular type and all at large.

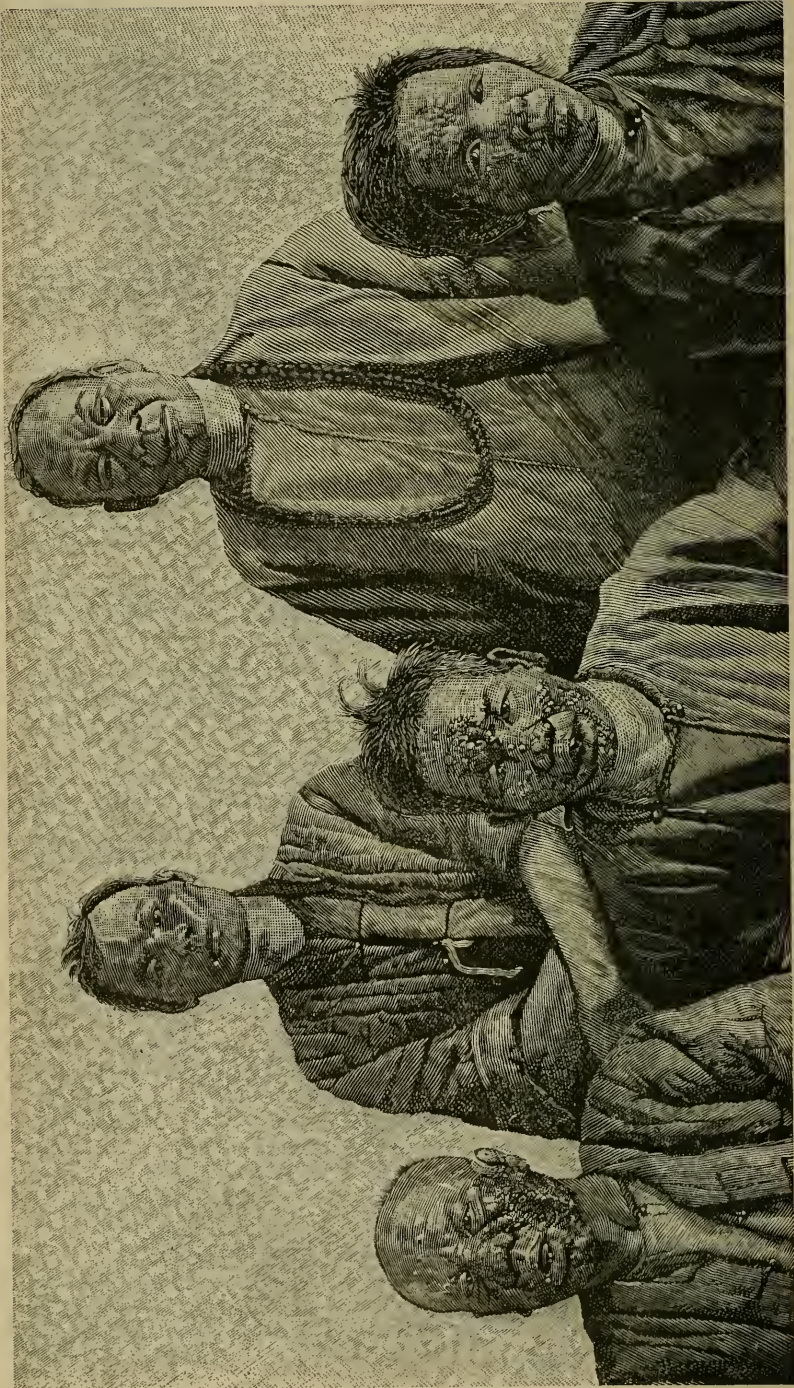
Dr. J. L. Babcock (N. Y. Med. Rec., Sept., 1888) states that three cases occurred at St. Louis in 1888.

In May, 1888, I, myself, saw a young man on the streets of Los Angeles, who presented the appearance of a leper, but there was no opportunity for thorough examination.

The writer of an article in the editorial pages of the Pacific Medical and Surgical Journal, for August, 1888, states that he saw a Chinaman on the street in the Chinese quarter of San Francisco, a few months previously, who was obviously a leper, but not in a very advanced stage. In the month of February, 1890, no less than three lepers, all white men, have been apprehended in San Francisco and sent to the Twenty-sixth-Street Hospital. One, a teamster, forty-one years old, has been affected

* Ah Loue and Chung Ah Fook, two of the five shown in cut, taken in San Francisco, March, 1890.

† I have photographs of about fifty cases of leprosy, mostly Chinese, all of which are supposed to have originated or resided in California.



AH HUNG, No. 1.

AH LOUE.

CHUNG AH FOOK.

SEE TONG TAI.

AH HUNG, No. 2.

CHUNG AH FOOK.—Age, 29; admitted into hospital, September 26, 1888. Eighteen years in California at Sissons, then two years each at Ingrams and Los Angeles. Tubercles on hand and face; paraplegic; denies anæsthesia. Sick three years.

AH LOUE.—Age, 38; admitted, September 18, 1888. Cutaneous and subcutaneous infiltration of tissues of face, especially of eyebrows, lids, and malar prominences (a mild leontiasis); no ulcerations; no distinct tubercles; hands characteristically puffed; anæsthesia probable, but not noted. Denies having lived in Los Angeles, but admits having lived in Arizona and Colorado. This Chinaman undoubtedly lived in Los Angeles, but like many of his race "evades the truth."

AH HUNG, No. 1.—Age, 35; coal miner; admitted, January 31, 1889. A characteristically tubercular case, no infiltrated areas, no maculæ, no anæsthesia—purely tubercular.

SEE TONG TAL.—Age, 35; smooth shining infiltration of tissues of face; maculæ—atrophy of orbicularis palpebrarum of both eyes—anæsthesia; no tubercles.

AH HUNG, No. 2.—Age, 35; cook; last residence, Napa City; disease of four years' standing. Origin, first a spot on face (maculæ); then a tubercle, this disappeared then reappeared. Face and hands tuberculated, infiltrated, and fissured.

All these five cases were shipped to China on steamer "City of Pekin," October 29, 1889.

The above cases, with their names, histories, etc., have been kindly furnished me by Dr. W. F. Finnie, 229 Geary Street, formerly Resident Physician, City and County Hospital, San Francisco.

seven years, and has been twice at the hospital before, but escaped. Another, now twenty-one years old, lived for some years at Honolulu, and has been affected several years. The third, a native of Guatemala, fourteen years old, and one year a resident of San Francisco, employed as a dishwasher at various restaurants. He has been a leper for three years.

CAUSES DETERMINING LEPROSY.

Twenty years ago, writers on this subject were much inclined to ascribe the disease to endemic causes, such as proximity to the seacoast, low altitudes above sea level, high temperature, excessive moisture in the atmosphere, etc. It is found, however, that the malady prevails where all these conditions are absent. A fish diet has been accused by many writers of being the cause, but the Hindoos of the interior rarely eat fish. In India, it has been attributed to deficiency of salt in food, because the poorest people at the same time abstain most from taxed salt and furnish most cases of the malady. Elsewhere no one has thought of this as a cause. It is true that leprosy attaches most to people lowest in the scale of intelligence, of wealth, and of the comforts of life. Such people live most crowded in their habitations, particularly in their beds, and eat with their fingers from a common dish. They have too little clothing to allow frequent changes and clean attire, soap is little used, and personal cleanliness neglected. All these conditions favor contagion, and it is found that contrary conditions are attended with proportional exemption from the disease. The improved condition of Norwegian immigrants in this country, rather than any difference in the climate, has resulted in the moderation and gradual disappearance of leprosy.

Until ten or fifteen years ago most writers of the present age regarded heredity as the chief factor in the production of this disease, and many still adhere to the belief. It is, however, rapidly losing ground, and there are some who are disposed to estimate it of little or no force. Inasmuch as at least a majority of the children of lepers fail to take the disorder, all must admit that the influence is weak. What becomes of heredity among the children of Norwegian immigrants in the States of Wisconsin, Iowa, and Minnesota? Two hundred lepers in the first generation afford only one in the second generation during fifty years.

Dr. White states that in 1848, eleven inmates of the Tracadie Asylum had altogether sixty-three children, none of whom were diseased. On the other hand, the rapid spread of leprosy in the Sandwich Islands between 1860 and 1875 makes it impossible that any considerable proportion could have inherited the taint. Aside from the mortality due to this malady, the native population there is rapidly diminishing, and it is found that lepers have few children, most of whom are either born dead or die young.

According to Dr. G. L. Fitch, who lived several years at the islands, and who must have had abundant means of observation, of twenty-six children born at the Molokai Settlement of parents one or both leprous, and aged from twenty-one months to fourteen years, only two were lepers in 1884; but Dr. Mouritz, two years later, found nine lepers among them. Contagion was doing its work. The group of sixteen cases at Charleston could not be accounted for by heredity, for the Jews belonged to three different families, and there were besides Irish, native whites, and blacks; neither did heredity succeed in perpetuating the

disorder. In only a very small number of the forty-two cases now at New Orleans does Dr. Blanc succeed in finding lepers among their relatives, either as antecedents or descendants. Of course, it is out of the question that heredity could have played any part among the white lepers of the Sandwich Islands, of whom sixteen had been sent to the leper settlement previous to 1880.

The advocates of heredity agree that it is much stronger in the maternal than the paternal line, but offer no explanation. It is evident that children are in far closer social relation with the mother than with the father, especially during the first eighteen months of life, so that the chance for contagion would operate in the same degree. Instances are given of skipping over one generation in hereditary transmission. It often happens that children are special favorites of grand-parents, and are in closer relation with them than with their parents. It would be interesting to note whether atavism in leprosy could actually be explained in this way. In my judgment it is quite easy to account for the cases that occur in the same family otherwise than by inheritance, for there are more opportunities for contagion in the same household than elsewhere. Therefore, without totally rejecting the influence of heredity, I should say that; in our present knowledge, it is not necessary to invoke it. The real test would be to remove immediately after birth a number of children from leprous parents, and strictly guard them against contagion. Then if any of them should become lepers, there would be satisfactory evidence of inheritance. Such a test has not yet been afforded, but it may soon be supplied in the Kapiolani Home, devoted to the care of girls, the children of lepers not yet confirmed as lepers themselves, and other suspects of the disease, which was opened in the Hawaiian Islands in November, 1885.

The notion that leprosy is an offshoot, or form, or stage, of syphilis, probably originated in India, where it is entertained by many native and a few European physicians.

So far as I learn, only two medical men who have lived on the Sandwich Islands hold this opinion, namely: Drs. Geo. L. Fitch and F. H. Enders, and the latter is by no means positive. Dr. Fitch's theory of leprosy is thus enunciated (*Pacif. Med. and Surg. Jour.*, Oct., 1885): "I believe myself to be fully justified in saying that leprosy is a disease which cannot be communicated from a leper to any other person, by, through, or under any combination of circumstances, except heredity; and that even this plays but little part in the propagation of the disease, we may know from the fact that from 1866, when Kalawao Settlement was founded, until March 1, 1884, two thousand nine hundred and forty-one lepers were consigned there, and up to October 9, 1884, only twenty-six children born in the settlement were alive, where either parent was a leper before the birth of the child. * * * Suffice it to say, that I fully believe leprosy to be a fourth stage of syphilis, or form of scrofula subsequent to syphilis, occurring but rarely except in a virgin race, or contracted from a member of such race; and then only in persons of broken down or cachectic, nervous constitution, and rarely met with among Anglo-Saxon or Celtic races, except in blondes." *Per contra*, Drs. Arning and Emerson aver that persons contract leprosy whose parents were free from it, and who have never had syphilis. It would be violence to all probability to suppose that the leprosy of Fathers Damien and Gregory, of the Hawaiian Islands, and of Father Bogliori,

of New Orleans, who became diseased while in discharge of their sacred functions, was due to syphilis, either inherited or acquired.

This theory of the identity or relationship of the two maladies must have arisen, both in India (where Surgeon-General Moore holds that view) and the Islands, from their joint prevalence in those countries, and their associations in many individuals. Dr. Fitch lays great stress upon his failure to syphilize several lepers by inoculation with syphilitic virus. This is explained by their being already syphilitic, as the majority of the natives of the islands are said to be.

Let us now note the history of the two diseases. Leprosy has prevailed in the Old World from time immemorial. Constitutional syphilis is not known to have existed in the Eastern Hemisphere before the discovery of the New World by Columbus; but it is certain that within a few years after it seized on all classes of people in Italy and Spain, and rapidly spread over Europe. It was a terrible stranger, and its ravages, both in extent and severity, were like those of smallpox among the American aborigines, and leprosy among the Hawaiians. There is abundant mention of venereal sores and gonorrhœa in ancient literature, but nothing like constitutional syphilis was described till within ten years of the close of the fifteenth century; or after the first visit of Columbus to America.

On the other hand, there is no proof that leprosy existed among the aborigines of America before 1492. Again, it is said that syphilis has long been prevalent in Kamtchatka, but leprosy is not.

Dr. M. Hagan, of Los Angeles, who formerly resided in the Sandwich Islands, and is good authority in regard to the disease, says: "It has been settled beyond dispute that a leper will contract syphilis and recover from it with proper treatment, while the original disease goes on and ends in death." At least 95 per cent of syphilitic cases can be thoroughly cured by proper treatment sufficiently prolonged, but the remedies which control it are powerless in leprosy. On the other hand, the remedies which stay the progress of leprosy have gained no success in syphilis. The heredity of uncured syphilis is undisputed, and generally apparent at birth; that of leprosy, if real, never appears till there has been opportunity for contagion and a sufficient period of incubation.

As to the contagiousness of leprosy, there is abundance of evidence that this was the accepted and general belief of former ages. The Hebrew segregation of lepers proves it. Their collections in hospitals throughout Europe in the middle ages, and their being obliged, when outside, to wear a peculiar garb, and warn other persons of their presence by ringing a small bell, have the same significance. In the present age so few cases are found in the civilized world, and the latent period is so much longer than in all other contagious maladies, except possibly hydrophobia, that some other cause is sought and found, which satisfies those who forget the opinions and practices of former ages when there were more opportunities for observation.

In 1867, the Royal College of Physicians of London, published their famous opinion in opposition to the contagiousness of leprosy, on hearsay evidence, which opinion has governed the action of the British Government ever since, and has exerted a world-wide influence.

In the discussion before the French Academy of Medicine in 1885, only three French physicians held the doctrine of contagion; but in 1888

the number was much larger. (Dr. P. A. Morrow, N. Y. Med. J., July 29, 1889.) It is encouraging to note that the Committee on Leprosy of the Royal College of Physicians has recently recommended another investigation of the subject.

In China and India leprosy prevails as of old, where repression has never been tried effectually. In Europe the plan of segregation during the thirteenth, fourteenth, and fifteenth centuries nearly eradicated the malady. For want of such repression leprosy is now increasing in most of the British colonies. New Brunswick is a notable exception. Dr. Hansen remarks: "I have met with families of which only those members became leprosy that had emigrated to places where leprosy prevailed. The members that remained at home did not catch the disease." With due regard to cleanliness and avoidance of all secretions and exudations from lepers he thinks there is no danger.

Proofs of communication through contagion are innumerable. There is no other way to account for the rapid spread of leprosy in the Hawaiian Islands, and especially its contraction by a few white residents. For example, Dr. A. W. Saxe, in a paper read to the California State Medical Society in 1881, gave an instance of three children of American parents, who remained healthy, having become lepers at Honolulu. Their mother did not nurse them, and they evidently were somewhat inoculated by a native wet nurse or some leprosy playmate. The supposition that the disease existed among the indigenous Mexicans is probably a mistake, for the aboriginal race are free of it, except where they have lived in close relations with the whites or negroes, as in those regions settled by the Spaniards and Portuguese. It is much more likely that American leprosy was derived from Europe and Africa. Not heredity, nor syphilis, nor endemic conditions could have given rise to the group of sixty cases in the village of Spain, to the outbreaks in New Brunswick and Cape Breton Island, to the sixteen cases at Charleston between 1846 and 1876, to the forty-two now at New Orleans, or to the two at Galveston. It is often impossible to trace the source and mode of contagion, but the same is true with all the disorders whose contagiousness is undisputed.

Besides, we have the evidence of inoculation, which is incontrovertible. Dr. Fitch gives some instances of failure, and adduces the convict Keanu, who was inoculated at the Sandwich Islands by Dr. Arning, in 1884, as an alternative to the death penalty; but the man died of leprosy since Dr. Fitch wrote, and some of his other instances may result in like manner.*

Dr. J. C. Tache, of Canada, relates the following: "At the funeral of one of the first lepers at Tracadie, a young man who helped to carry the coffin on his shoulder received an abrasion of the skin from its sharp edge. There was a flow of liquid from the coffin, which wet the abraded spot, and he had no opportunity for several hours to change his clothing or cleanse himself. He had no hereditary taint, but died a leper within a few years."

Dr. A. C. Smith, of Newcastle, N. B., relates the case of a boy now far advanced in leprosy, who at three years of age was waited on by a lep-

* As to Keanu, Dr. Arning supposed that there had been no leprosy previously in his family; but Dr. S. B. Swift, resident physician at the Molokai Settlement, avers that this man's son and sister's son were both lepers before his inoculation. (*Occidental Med. Times*, April, 1890.) Consequently, it is possible that Keanu may have contracted leprosy in the natural way; though the bacilli were found at the point of inoculation for more than a year afterwards.

rous woman while he was in the healing stage of a burn. There had been no leprosy in his family. Dr. Hansen, surgeon to the leper hospital at Bergen, has published some cases where inoculation had taken place. Dr. Saxe gives the case of a physician's son who acquired the disease after inserting a pin into his leg, which a little Hawaiian leper had just previously thrust into an anæsthetic patch on his own leg. (Prof. White, *Am. Jour. M. S.*, October, 1882.) Dr. Hillebrand relates this occurrence in Borneo: A colored leprous boy ran a knife into an anæsthetic part of his body. His white playmate then ran the same knife into his own flesh. The white boy went to Europe, and nineteen years after developed leprosy. It has been suggested that leprosy might be inoculated by the bites of flies and mosquitoes coming from leprous sores; and it is supposed by Dr. Manson that Elephantiasis Arabum is communicated in this way. The supposition is certainly more probable with the former than the latter, and might account for some mysterious cases.

It is important to make a distinction between contagion and infection. Unfortunately, there is a want of precision in their definitions, and great confusion in the use of the terms. Here I would suggest that we understand contagion to mean the reception of a disease poison through some solution of continuity, and infection its absorption through an unbroken surface. Contagion would, therefore, mostly operate by immediate application of virulent matter to an external abraded spot; and infection commonly be produced on respiratory surfaces through the medium of the atmosphere. The same distinction would apply to microbes in the alimentary canal, and on the genito-urinary parts. It follows, therefore, that infectious diseases only are liable to become epidemic. In this sense leprosy would be contagious but not infectious, since it is probably necessary for the virus to come in contact with an exposed capillary surface in order to be absorbed. This is indicated by the safety of persons causally meeting lepers, and it explains the fact that individuals have lived in intimate relations with lepers for years without harm. Proof of the absolute non-contagiousness of leprosy is claimed from the well known and numerous instances of escape during many years of married life between lepers and non-lepers. Safety is attributable to a sound skin, or failure to apply the virus to an absorbing surface. The contagiousness of syphilis is never questioned, but it is probably not communicated through a sound mucous surface, for many incontinent men have always escaped it. The explanation that sexual relations with lepers is less dangerous than with syphilitics, is the fact that leprosy is not apt to attack the generative organs.

The period of incubation is probably rather indefinite. Most writers say from five to ten years, but it is often less. In the case of the man inoculated by Dr. Arning, there were manifest symptoms of leprosy within three years, and the young man mentioned by Dr. Tache began to complain within a year, but lived about eleven years. It is not improbable that there was a mistake in the period of incubation given for the first communication of the malady at the little village in Spain, previously mentioned as only a few months; it might have been longer. Dr. Hansen mentions the case of a Hollander who became a leper ten years after his return from the West Indies. I have already mentioned a case in this paper, in which the latent period was supposed to be forty years, but this seems incredible.

As to sex, the common opinion is that males are considerably in excess of females. This is probably correct, though females in the seclusion of home would be more apt to escape observation. But it is plain that men and boys, being more away from home, in all sorts of company, would be exposed to contagion. With heredity as the prevailing cause, there should be no such marked sexual selection.

It is agreed that the majority of cases begin between the ages of fifteen and forty years, which is the period of greatest activity and exposure. Under three years of age it is extremely rare. Dr. Fitch has not known a case before the commencement of second dentition, but Arning in the Sandwich Islands, and Kynsey in Ceylon, have seen it at three years.

Dr. Torrens has observed it in infancy in the Canary Islands, but the precise age is not given. We may safely conclude that there is always time for a reasonable incubation after exposure.

The natural duration of leprosy varies with the type and circumstances influencing progress. Lewis and Cunningham give the average duration of the tubercular form in India as six years shorter than that of the anæsthetic, and fourteen years for cases in general. Dr. Graham (Wood's Handbook) states that leprosy usually proves fatal in seven or eight years. Danielson and Boeck, of Norway, give the average duration as eight or nine years for the tubercular type, and eighteen or nineteen for the anæsthetic, but sometimes prolonged to forty years. Dr. Arning, in 1884, gave the duration from five to ten years, but Dr. Hillebrand, whose experience in the Islands dated fifteen years earlier, put it at three to five years. It is always understood that cases of mixed type have a progress slower than the tubercular and faster than the anæsthetic.

The circumstances modifying leprosy are numerous and varying in effect. Any causes which lower the standard of health, like previous sickness, deficiency or bad quality of food, exposure to bad weather, excessive exertion, sexual excesses, intemperance, living in close and crowded apartments, deficiency of clothing for change, neglect of ablutions, all favor both the contraction and rapid progress of the disorder. Improvement in all these respects accounts for the development of few cases among Norwegian immigrants, and, with a single exception, of the exemption of their progeny in the United States.

Admitting the contagiousness of leprosy, it is possible that it varies greatly in degree among different individuals and races, as is true of other diseases. Dr. Mouritz concludes that about 18 per cent of the Islanders resist contagion totally, judging from his experience at the Molokai Settlement. It is doubtful whether 1 per cent would resist intentional inoculation. Where the disease has prevailed for thousands of years, as in Egypt, India, and China, and where the anæsthetic is the prevailing type, the principle of natural selection and survival of the fittest would gradually increase the resistance of the people, and in time those races might become exempt. In the absence of effective repressive measures, the population must otherwise have greatly diminished. The same seasoning for ages of the natives of those countries likewise explains the protracted course of the disorder. Without such acquired resistance, and in the absence of repressive measures, its ravages would equal what was experienced in Europe in the twelfth, thirteenth, and fourteenth centuries.

Without apprehending a high degree of contagiousness for leprosy, or

great risk in ordinary intercourse, it is clear that serious danger often lurks in unexpected quarters. Two priests and one physician, Dr. Edward Hoffman, undoubtedly contracted it on the Islands while pursuing their ordinary avocations; also a priest at New Orleans. What might have happened—indeed may already have been incurred here in California—from the Marysville barber who continued to shave men's faces for years after he became a leper; from the San Francisco teamster who escaped and pursued his regular business for more than two years; from a far advanced case lately found in a Chinese laundry at Sacramento; from an escaped leper supposed now to be engaged in fishing in the river; from two Chinese cooks and a Mexican dishwasher sent to the San Francisco pesthouse within the past year? Probably not one of these individuals could point out the particular source of his own taint; more than possible other mysterious cases may follow them, like lengthened shadows to a hopeless doom. In fact, an instance has actually occurred in California of a white boy, now a leper, whose father has employed Chinese both on his ranch and in his house, some of whom are said to have had a cutaneous disorder.

BACILLUS LEPRÆ.

The credit of first discovery is given to Hansen, of Bergen, of date varying from 1869 to 1874, according to different writers.

In 1879 Neisser announced an independent discovery. The latter has inoculated rabbits and dogs with leprous matter, and so produced inflammatory nodes corresponding to human leprosy. He supposes that the spores enter the system and develop wherever they find a suitable nidus, especially in the lymphatic glands. Thence they invade the entire body. Eichhorst states that artificial inoculation of animals has failed, and this has been Arning's experience in the Hawaiian Islands. Neisser, Damsch, and Vossius have succeeded in the culture of the bacilli at the infected spot. The bacilli are found in the skin, mucous membranes, peripheral nerves, lymph glands, testis, liver, spleen, and eyes; also in the blood, usually inclosed in white blood corpuscles. From the annual of Universal Medical Science for 1888 (Sajous), I condense the following: The bacilli lepræ have never yet been found in the blood. When introduced into the circulation these organisms probably are rapidly carried to the capillaries, and thence by diapedesis to lymph spaces, where they set up the characteristic changes. Lymph may contain the bacilli; glandular secretions, notably the urine, are almost entirely free. Tears, the nasal secretion, and the saliva swarm with them whenever the ocular, nasal, or bucco pharyngeal surfaces are lepromatous; also the alvine discharges in leprous diarrhœa. When the testes are involved the semen contains bacilli. The uterine mucus and vaginal secretions never do. Vaccinal lymph from lepers contains them. Leprosy may almost certainly be conveyed from venereal sores. The lymphatics and ganglia are characteristic and constant foci of the bacilli. The central nervous system is not affected by leprosy, as it is by syphilis. There are two methods of conveying disease through bacteria: 1. By direct contact, or inoculation; 2. Indirectly, through soil, air, water, or food. Arning has succeeded with the former mode, but failed with the latter, in his experiments

with leprosy. (This indicates that leprosy is contagious, but not infectious.)

Dr. Edw. E. Arning, by invitation of the Hawaiian Government, pursued the study of leprosy in the islands from 1883 to 1885. The following is a brief abstract of his observations in its bacteriology. He found bacilli in the trunks of nerves supplying anæsthetic patches, but not in the patches themselves, nor in chronic sores resulting therefrom. No bacilli in blood or urine. They were found in the nodules of the tubercular form. Culture experiments failed to reproduce bacilli. Inoculation failed to prove the disease in the lower animals. (It had failed in the convict Keanu up to the date of his departure. The animals should have been kept under observation at least three years.) He considers leprosy peculiar to mankind, and transmissible from one person to another directly through the bacilli, or through the intermediate stage of spores. Arning found bacillus lepræ in leprous corpses, even after the appearance of bacteria of putrefaction, but could not aver that they were alive. Bacilli are not found in the red maculæ of the face, which usher in many cases. Excisions from the point of inoculation of Keanu showed bacilli under microscope for fourteen months, but in diminishing numbers. After vaccination of lepers, he found bacillus lepræ in the lymph and crusts.

Dr. Prince A. Morrow (N. Y. Med. Jour., July 27, 1889) states that he failed to find bacillus lepræ in any part of a stillborn child at full term. (Repeated observations would throw light on the heredity of leprosy, and no opportunity should be lost.)

Dr. J. H. Stallard, of San Francisco, has kindly given me a report of his studies in the bacteriology of leprosy, and slides prepared by himself for microscopic observations. He finds that the bacilli persist in water and other fluids, notwithstanding the presence of putrefactive bacteria, for at least eighteen months. As they are motionless, and inoculation is inadmissible, we have no positive evidence of activity; but the slides show that the bacilli continue in every possible form, as spores, more or less aggregated; as bacilli, of various lengths and diameter; plain or beaded, single, or in closely woven zoöglæ. His experiments indicated water to be the vehicle of contagion. After immersion of leprous tissue in absolute alcohol for over a year, he found that subsequent treatment with water would not remove the bacilli, though they could still be seen *in situ*.

Dr. J. E. Graham (Wood's Reference Handbook) remarks: "It is probable that the spores or bacilli themselves find their way into the body through some lesion in the epithelium, and thus by their growth the system is affected. Nodules and infiltrations are thus the result of specific irritation, due to presence of bacilli."

The mechanical action of these microbes seems to me a correct supposition. Their growth and pressure on blood vessels and nerves satisfactorily explains the mutilations and anæsthesia, and pressure on solid tissues accounts for the ulcerations characteristic of the disorder.

The morphological resemblance of the bacilli of leprosy to those of tuberculosis has been observed by bacteriologists; likewise the slow growth of both microbes. The analogies in the natural history of the two disorders are equally striking; their slow progress, their frequent arrest and occasional retrogression; the usual relapse and fatal termination, unless anticipated by a fatal intercurrent attack of another disease;

the prolonged period of incubation; and probably in both cases a necessary solution of continuity for admission of the microbes to the internal organism. Moreover, it may be found, in time, that heredity figures about as much in one as in the other.

The uniform presence of the bacilli in lepers, whenever looked for, and their absence from non-leprous subjects, demonstrate their connection with the disease. Successful inoculation demonstrates their causative agency and its contagiousness. Even without the evidence of specific bacteria, proofs of the communicability of leprosy are, in my judgment, satisfactory; with it there is no escape. It is improbable that these microbes should find access through sound mucous surfaces of the respiratory or alimentary tract, for then the disease would be infectious, like measles and typhoid fever, and vastly more prevalent. It is apparent, however, that individuals affected with lesions of any tract, whether external or internal, accessible to the air or to food or drink, might offer an avenue to leprous matter, either in the moist or pulverulent state. The morbid intestinal discharges and external ulcerations of lepers are known to abound in the specific bacilli, and are doubtless the general source of contagion. Who knows the antecedents of old rags, of the cast-off clothing that goes to the shoddy factory, of the second-hand clothing which many people handle and wear? The persistency of leprous bacilli has been demonstrated. Such considerations give a credible explanation of some mysterious cases, and a warning of danger lurking at unexpected moments.

THE CONTROL OF LEPROSY.

This subject naturally falls under two heads: (a) curative; (b) preventive.

It is not my intention to make even the most superficial review of the various remedies and modes of treatment in this malady, but only to notice a few agents lately approved. Dr. Arning found that the use of ointments having 10 per. cent strength of salicylic and pyrogallie acids destroyed the tubercles, softened the infiltrations, and sometimes restored sensibility to anæsthetic patches. Salicylic acid was tried, also, internally, with apparent benefit. Hypodermic injections of corrosive sublimate, one hundred and sixty in the course of two years, were followed by amendment in one case; in another eighty injections were followed by retarded rate of progress. He found electricity beneficial to the anæsthesia. Potassium iodide failed of good results. With apparent improvement from certain agents, as above, he does not claim lasting cures. Dr. C. J. Peters, of Bombay, has used the following course:

1. Carbolic oil (one in forty) is rubbed over the whole body, to promote healthy action of the skin. This is followed by soap and water ablution.

2. To the ulcerated spots an emulsion of gurgin oil and lime water (one in three) is applied by friction, or on cotton with a bandage.

3. To the anæsthetic patches and tubercular growths cashewnut oil is applied with a brush or feather.

4. Internally, five-minim doses of Chaulmoogra oil with five grains of sodium bicarbonate in one ounce of peppermint water are given. In some cases three-grain doses of potassium iodide. The results obtained

were healing of ulcers, dispersion of tubercles, restoration of sensibility, and relaxation of contractions.

5. The general testimony, however, is to the effect that any mode of treatment is in the end disappointing. Arrest of progress is only temporary, being usually followed by suspension of treatment. Indeed, it is not certain that long perseverance would be attended by permanent relief. At the Tracadie Hospital patients have been discharged apparently cured, but they generally returned to die. The results are even less encouraging than in the treatment of pulmonary consumption. Doubtless some have improved enough to be discharged; have gone out and died of other diseases, and have been considered cured of their leprosy; but there is no proof, and it is rather probable that in time it would have returned. The health authorities of the Hawaiian Islands consider leprosy practically incurable, though they acknowledge that life may be prolonged by certain medical treatment, by good food, and by favorable sanitary conditions.

6. Since, then, so little is to be expected of curative treatment, there is no question of the necessity of rigorous preventive measures. In the earliest stages recognition of the disease is difficult and generally impracticable, but then the danger is small. As soon as a diagnosis can be reached without risk of making a mistake, there should be no hesitation or failure about enforcing segregation. Long ago the people of California recognized the danger of planting leprosy on this coast through Chinese immigration, and for more than fifteen years legislation gave abundant authority for its exclusion and repression. Section 2952 of the Political Code reads as follows: "It shall not be lawful for lepers or persons affected with leprosy, or elephantiasis, to live in ordinary intercourse with the population of this State; but all persons shall be compelled to inhabit such lazarettos, or lepers' quarters, as may be assigned to them by the Board of Supervisors of the city or county in which they shall be domiciled or settled; and the Boards of Supervisors are vested with power and are required to make all necessary provisions for the separation, detention, and care of lepers or persons affected with leprosy, or elephantiasis, settled or domiciled in their respective cities or counties. The Superintendent or manager of all lepers' quarters under this chapter shall forward quarterly statements, showing the name, age, sex, and birth-place of each leper in such quarters, to the Secretary of State, who shall keep a proper record of such matters for the information of the public."

Section 2955 provides for the inspection of all persons arriving in California from foreign ports by the Commissioner of Immigration; those found to be lepers are to be taken in charge by him and placed in a suitable lazaretto, furnished by the Supervisors whenever necessary, and there detained separate from the general population so long as they shall elect to remain in the State, or until they have recovered; but they are allowed to return whence they came. The master or consignee of the vessel bringing lepers is liable to a penalty of \$1,000 for failing or refusing to comply with the law.

In 1883, the Board of Supervisors of San Francisco supplemented the above Act by an order which forbids positively the landing of lepers from any ship, their transfer to another vessel, and their harboring by any person outside the lazaretto. Captains of vessels are required to

report all such cases on arrival. Penalty, fine not less than \$500, or imprisonment not less than six months for any violation.

There is ample legislation in California to deal effectually with leprosy, but I regret to find the health authorities in some towns lax about enforcement. Such has been the recent experience at Sacramento, and some time ago at Los Angeles. I find, also, that there is *no record of lepers in the office of the Secretary of State, as the law requires.*

California is far in advance of the other States of the Union in laws for the control of leprosy. In Oregon, Health Officers appointed by the Governor for the ports of Astoria, Coos Bay, and Gardiner, are required to board all vessels arriving by sea and to examine passengers and crews for such contagious diseases as smallpox, cholera, and leprosy. This Act provides for no lazaretto, or express disposal of lepers. The Board of Health of New York City is empowered to send to the Marine Hospital any person, not a resident of the city, affected with a malignant or dangerous contagious fever, and there detain him at their pleasure. The provisions of this chapter extend to all diseases which, in the opinion of the Board, shall be dangerous to the public health. Residents of the city may be isolated and guarded at their homes, and the Board may exercise all such other powers, whenever a contagious disease shall appear in the city, as in their judgment the circumstances of the case and the public good may require. Thus it appears that their general powers might be construed to include leprosy, but so far this has not been done. In Massachusetts, Boards of Health have power to isolate and provide necessary attention to persons affected with plague or other sickness dangerous to the public health, either by removal to another house or by removal of other persons from the domicile; and I am informed that latterly lepers have been kept separate from other people.

The Federal Government, having had its attention called to the urgent need of action, has already taken measures for the exclusion of lepers from foreign countries, as the following shows:

CIRCULAR.

Regulation to prevent the introduction of leprosy.

TREASURY DEPARTMENT, OFFICE SUPERVISING SURGEON-GENERAL, M. H. S.,
WASHINGTON, D. C., December 23, 1889.

To Medical Officers of the Marine Hospital Service, Collectors of Customs, and others concerned:

The national quarantine Act, approved April 29, 1878, entitled "An Act to prevent the introduction of contagious or infectious diseases," provides that no vessel or vehicle coming from any foreign port or country where any contagious or infectious disease exists, or any vessel or vehicle conveying persons or animals affected with any contagious disease, shall enter any port of the United States, or cross the boundary line between the United States and any foreign country, except in such manner as may be prescribed.

Attention is now directed to the increased prevalence of the contagious disease known as leprosy in several foreign countries, and the danger of its increase in the United States through the immigration of persons affected with leprosy, and by direction of the Secretary of the Treasury the following regulation, as framed under authority of the foregoing Act, subject to the approval of the President, to protect the people of the United States from the introduction of leprosy:

1. Until further orders, no vessel shall be admitted to entry by the officer of the customs until the master, owner, or authorized agent of the vessel shall produce a certificate from the Health Officer or Quarantine Officer at the port of entry, or nearest United States Quarantine Officer, that no person affected with leprosy was on board the said vessel when admitted to free pratique, or in case a leper was found on board such vessel, that he or she, with baggage, has been removed from the vessel and detained at the quarantine station.

2. Medical officers in command of United States quarantines are hereby instructed to detain any person affected with leprosy found on board any vessel, but such officer will permit the departure on outgoing vessels of persons detained at quarantine in pursuance

of this regulation, provided such vessel shall be bound to the foreign country from which the said leper shall have last sailed.

JOHN B. HAMILTON,

Supervising Surgeon-General, Marine Hospital Service.

Approved: WILLIAM WINDOM, Secretary.

Approved: BENJ. HARRISON.

Inasmuch as the control of leprosy, within the national borders, belongs to the separate States, it is highly desirable that they should enact substantially uniform laws. The subject is a suitable one for the consideration and action of the Conference of State Boards of Health, and this body could frame a bill suitable as a model for all the States. It would then be the duty of each State Board of Health to procure the passage of an Act for that purpose.

This part of the subject would be incomplete without noting some necessary precautions in disposing of leprosy corpses. Bacteriologists have shown that the bacilli of leprosy, unlike many others, withstand the action of the bacteria of putrefaction. We know that the soil is poisoned for many years by the bacilli of anthrax, for the rapid contagiousness of the disease has proved it. The contagion of leprosy is so slow, that proof may never be made satisfactory how long the virus persists; but danger is to be apprehended, and it is easy to obviate it. The law should direct some effective method or methods of disinfection. Cremation would certainly be effectual, but could not be made compulsory in the nineteenth century. Whoever lives to the second half of the twentieth century, will probably witness the cremation of bodies dead of dangerous diseases. For the present we might be content with burial in quick lime, and might perhaps obtain legal authority to enforce it.

The full extent of this fearful malady no one knows. Few writers name even half the countries where it may be found. Though the civilized world has substantially won the victory, the enemy returns casually and carries off one or more victims from the best regulated communities. In all four quarters of the globe it retains a foothold. In its ancient seats of Asia and Africa, it holds undisputed sway, almost, without exception, stationary, or perhaps slowly declining, because the races are growing resistant by survival of the fittest. In Europe it has a stronghold in Norway, from which it may be dislodged and perhaps quite expelled within half a century. It holds ill-defined territory in Southern and Central America, the West Indies, and Mexico, and a small tract in British America. In Australasia it is occupying new territory.* In the Sandwich Islands there is a struggle for life between the newly civilized people and the destroyer. In our own country the portions once dominated by the Spaniards have had the earliest and the latest experience, even to the present hour. South Carolina has not escaped; Wisconsin, Iowa, and Minnesota have received it with Norwegian settlers, Utah with Mormon converts, and the Pacific States with Chinese. New York City is seldom without specimens, brought in ships from queer ports in foreign lands, and the other commercial cities are frequently startled with strange visitors. Occasionally, as at Charleston

*The President of the Board of Health for New South Wales reports at present twelve cases in Sydney—ten Chinamen, one Japanese, and one Englishman. Thus it is clearly, as in so many other places, almost exclusively a disease of Chinamen. (B. M. J., Feb., 1890.)

in the past, and New Orleans in the present, alarming numbers come to light.

Just now the point most threatened is New Orleans, for no legal barrier stands to protect the great city which, after a long and dreadful struggle, has lately gained the mastery of tropical yellow fever by quarantine. The successful method of Ulloa and Miro is forgotten or unheeded by the authorities, and must be rediscovered to save the people from the fate of the Hawaiians. Here in California the enemy, few and scattered, is in our midst, and others are liable to come on every ship from China and the Islands; but we have been fully warned, and are armed with lawful weapons. It is our own fault if they do not protect us.

One other provision is needed—a State hospital for lepers. Our statutes enable local authorities to act for themselves, but not one of the counties has a suitable lazaretto. San Francisco has always had more than half the lepers in the State, but its only accommodation is the pesthouse, where lepers and smallpox cases are lodged in the same house. That the lepers escape smallpox, and the smallpox patients escape leprosy, is rather good luck than good management. At least one leper has died of smallpox, and some leper of the future may be reminded of a former residence at the same institution for the other complaint. Apart from such improper association of subjects of the two diseases, the pesthouse is an insecure place. Only lately a leper in a far advanced stage has been recommitted, who escaped two and one half years ago, and was at large in the city during the whole interval. A small island near San Francisco would be the proper site for a lazaretto, and accommodations for one hundred lepers would be enough for present and prospective needs, inasmuch as most of the cases have hitherto been sent back to China.

It has also been suggested that a contract be made, if possible, with the Hawaiian Government, to have all lepers cared for at the leper settlement on Molokai.

In Louisiana there is imperative need of such an institution and of legislation equivalent to the Act of California. As to the other States, it would be sufficient to pass the necessary isolation Act, and leave its execution to the State Board of Health, with power to draw warrants upon the treasury, not to exceed a fixed amount, for the expenses. I would not be understood as encouraging any alarm on this subject, even in Louisiana or California. Our State needs only faithful enforcement of existing laws, with a suitable lazaretto, while Louisiana would be saved by a revival of the forgotten plan of Miro, which was successfully in operation just a century ago.

In conclusion, I would not be unmindful of courtesies and assistance rendered in the collection of data for this paper, from a large number of correspondents at home and abroad. They are too numerous for individual mention, further than is already indicated. Among them, officers of Health Boards have rendered especial service. To all I tender sincere thanks.

LEPROSY.

By WOLFRED NELSON, C.M., M.D., Member College Physicians and Surgeons, Province of Quebec; late Member State Board of Health, Panama, etc.

In the spring of 1888 it was my good fortune to pass some time in the island of Trinidad. While there (thanks to the courtesy of the Surgeon-General of the island, S. Leonard Crane, M.D., C.M.G.) I was given the *entrée* of the hospitals, convalescent homes, etc., over which he so ably presides. At the leper asylum I was introduced to Dr. Beaven Lake, in charge of the asylum, and was allowed to see the patients under his care and make a series of photographs. Six of the illustrations hereafter were made at the asylum, and the remaining two—cases of elephantiasis—were made at another institution, partly medical and partly charitable.

Now to consider the illustrations:



CASE 1.

CASE NO. 1.

Case of tubercular leprosy; patient, a negro from Venezuela, aged eighteen. He had been in the asylum since 1881. He was going from bad to worse. Three years previous to my visit, Dr. Rake had removed



CASE 2.



CASE 3.

several tubercles from his face. They reappeared within a year. He was a fearful looking object. Some of the tubercular masses were ulcerating or breaking down. Face, ears, wrists, and hands in places were masses of large tubercular growths.

CASE No. 2.

The same subject, showing the left side of the face. Masses of tubercles on some of the fingers were bandaged. His general health was good.

Dr. Rake informed me that the average duration of life in tubercular cases was eight or nine years. The Asylum Reports, page 24 of 1887, give a history of the case.

When the eyes are involved, as they often are, the disease begins in the conjunctive. Later there is corneal infiltration. Iridectomy gives temporary relief. The sight soon goes.

CASE No. 3.

Mixed case of leprosy; patient, a Chinaman. The tubercular growths did not trouble him very much. Dr. Rake was constantly removing dead bone in this case, and opening sinuses in the feet. Man, aged forty. Had been in the asylum three years. He must have acquired the disease in the island of Trinidad, as he left China many, many years ago.



CASE 4.

CASE No. 4.

Patient, a white woman—a creole of Trinidad; aged about forty-five; probably of Portuguese descent. Face shows nothing, and has escaped. The deformity of the hands was great—an anæsthetic case. The average duration of life in anæsthetic cases is ten years.



CASE 5.

CASE No. 5.

Negro, a native of Trinidad; a very old case; fully twenty years old; a purely anæsthetic case; absorption and amputation by nature of several fingers. Some of the fingers in these cases are in-curved. His face



CASE 6.

had escaped entirely. He was looking down while I was making the photograph, which will account for the drooping lids as seen in cut. One would fancy ptosis was present.

Strange as it may seem, many of the lepers, practically without fingers, have acquired a certain dexterity; can use knife and fork, and lift buckets, etc. It seems so strange to see nails growing over the knuckles, but the explanation is simple: the bones have been absorbed and the skin contracts, hence the nails.

Many of the lepers are allowed to do light work—gardening, etc. It keeps them employed and fairly happy. As a whole, they seem a contented lot. They receive the best of care, and have excellent quarters, etc.

CASE No. 6.

Patient, a negro; a very interesting case. Dr. Rake removed a cataract, and got good vision. He published an account of this case in "The Lancet," London, 1886. Patient's vision when I saw him, in 1888, was excellent. His left wrist was full of fluid. By compressing the parts the ends of the denuded bones communicated a grating sensation, as in Charcot's disease. The left carpus can be dislocated any way



CASE 7.

you like. Left hand was bent at a right angle to arm. Patient tottered in walking like an ataxic. A fellow patient had to hold him steady while I was taking the photograph. This case was deemed a very interesting one, and the novelty was to know whether the leprosy had invaded

the cord, or was it locomotor ataxia properly so called. An anæsthetic case.

CASES No. 7.

The men on the reader's right and left are coolies (*i. e.*, East Indians, employed as laborers on the sugar estates). They both have Elephantiasis Arabum. The man in the center is a West Indian negro, having Elephantiasis Græcorum. The former is not associated with leprosy, while the latter is occasionally, but only occasionally. Below are their legs:



The right leg of the patient on the reader's left was a mass of warty growths. The left leg of the negro in the center was a large, misshapen mass. The case on the reader's right shows uniform infiltration, or enlargement of both legs.

As much confusion exists in the ordinary medical mind regarding leprosy and its connection with elephantiasis, I purposely photographed the legs and their proprietors. As has been stated, Elephantiasis Arabum is not associated with leprosy, while the Elephantiasis Græcorum may be, but only occasionally.

Elephantiasis is said to be due to the *filaria sanguinis hominis*; but the latter is found only in some cases. Ligating the femoral for a cure is deemed a very doubtful expedient, as collateral circulation soon sets up, when the old condition obtains.

Dr. Rake is of the opinion that gangrene has been a direct result of the operation. (See Asylum Reports.) In certain cases, free incisions and drainage give relief to a certain extent, but the fluid soon accumulates again. Such cases are hopeless, unless you amputate. Dr. Rake met with a case of leprosy of face in a boy, associated with elephantiasis. The leg was amputated, but at the end of a fortnight pyæmia developed and killed the patient.

Many years ago, when I was a mere lad, my father, the late Dr. Horace Nelson, of Montreal, amputated a leg four inches above the knee, for Elephantiasis Græcorum. The patient was a French Canadian; recovery was perfect. The leg is in the Museum Medical Faculty of McGill College, Montreal.

I have heard of but one case of leprosy in Montreal. It occurred many years ago, and it came under the observation of the late Dr. R. Palmer Howard, who for some days was sorely puzzled by it, but later diagnosed it correctly.

So much for the photographs. I have others by me; but owing to my leaving for England and the Continent earlier than usual, I cannot report them at present.

Now for a few general considerations regarding leprosy, a disease, by the way, that of late has made much unnecessary stir, great sensationism, as well as causing gross injustices, if not positive cruelty, to several unfortunates discovered in the United States. A few facts, and no theory, regarding this most ancient of diseases: During my five years at Panama, and extensive traveling since, all within the Tropics, I have seen a great deal of the disease. All along the Spanish Main it may be found; also in the West Indies. It is not confined to the lower classes.

Dr. Rake's opinion regarding its cause is that shared by all the students of the disease known to me. He deems the predisposing causes, bad food, bad ventilation, and neglect of personal hygiene; or, in other words, the same causes that predispose to phthisis predispose to it. He says that the parallel between leprosy and phthisis is an extraordinary one. The bacilli of the two diseases respond to the same chemical tests; the enlargement of the glands, the caseation, etc., being identical with phthisis. The latter disease gives the heaviest mortality among lepers, causing a fourth of all the deaths at the asylum at Trinidad.

Years ago, while studying the disease at Panama, it was thought by some writers that sexual connection was the means *par excellence* for propagating the disease. It is not at all unusual to find a married couple, one of whom may be a leper, and the issue may wholly escape the disease.

In the Sandwich Islands, of thirty or forty children born to lepers, but a very small proportion have inherited the disease, two or three per centum only. (See Report Board of Health, Honolulu, 1886.)

Is leprosy in any sense contagious, as we understand contagion? Dr. Rake says that it is not. Such is my opinion. Inoculations made by him at the hospital have failed to produce the disease. (See Island Reports, 1886.) Finally, I do not know a single physician *familiar* with the disease who deems it contagious. All the evidence is quite the other way.

While in Trinidad I asked the Sister of Charity in charge of the Apothecaries' department how long she had been there. Her reply was six and twenty years. I then asked if any Sister of Charity had ever shown any signs of the disease. "Not one," said she. "Pray remember, six and twenty years within a lepers' asylum." A Lady Superior and eight Sisters of Charity, nearly all French women, have charge of the asylum. They are noble women, passing their days among the "living dead." No interviews, no praise from princes, give them publicity; they are satisfied to do their duty without parading it before the world.

Had leprosy been a highly contagious disease how can one explain their immunity?

The Surgeon-General, a gentleman of life-long experience, is no believer in its contagiousness.

It will be safe to state that the danger from lepers is almost wholly imaginary, and exists in the minds of a few medical men in this country who seem to adopt the sensational views of the lay press.

At home, in Canada, Dr. Smith, who has been making careful inquiry among the lepers at and near Tracadie, New Brunswick, states emphatically that it is dying out.

As to treatment: Leprosy practically is incurable; hence, treatment practically is nil. Cleanliness, good diet, fresh air, etc., meet the general indications. Some remedies, such as arsenic, chalmangra oil, etc., and change of scene, are said to be useful. At times slight changes for the better may be noted, but they are temporary. Upon a return to their old habitat the disease resumes its sway. The treatment consists in meeting complications as they arise.

Dr. George Dock, of Galveston, Texas, found two well marked cases in that city—native cases, if I may so term them. He read a paper on them last year at the meeting of the Texas State Medical Association at San Antonio. One of his cases sent to Colorado, improved. The other was stationary—a well marked case, tubercular of many years' standing; man's wife shows no signs of it.

Dr. Guiteras, now of Philadelphia, formerly of Charleston, South Carolina, told me some years ago, when we met in Florida, of seven cases studied by him in Charleston; all Americans, if I remember rightly.

Quite recently, when in New Orleans, Dr. Austin, who has practiced there a lifetime, told me of some fifteen cases. He did not deem it contagious, or that it was increasing. He also is fully of Dr. Rake's opinion that the disease is due to bad hygienic conditions, etc.

One day while in the Post Office in Little Rock, Arkansas, I saw a well-marked tubercular case.

In a letter to me from Dr. Beaven Rake, of date April 23, 1890, he reaffirms his view that leprosy is not contagious, as we understand contagion. He also adds that some authorities deny that it is hereditary.

This isolating of lepers by taking them from their families, is cruel and wicked. Phthisics, we know, are sources of great danger, yet we do nothing. They travel in sleeping cars, expectorate everywhere, yet nothing is said. We do nothing to isolate syphilitics. The sensational articles in the lay press have been adopted by a large section of medical men as gospel. Let us, as intelligent medical men, keep to facts. Let us be just, and not lend ourselves to assisting in oppressing the sick and afflicted. Let us speak knowingly or be silent. Some of the enactments regarding lepers in this country are a blot on legislation, and an admission of ignorance that is wholly incomprehensible to any student of leprosy.

NO. 32 NASSAU STREET, NEW YORK CITY, August 4, 1890.

RECENT PROGRESS OF SANITATION IN CALIFORNIA, AND OUR PRESENT SANITARY NEEDS.

By W. R. CLUNESS, M.D., Sacramento.

(A paper read before the State Medical Society.)

Having reluctantly accepted an appointment to address this society on some subject relating to public hygiene, I would respectfully invite your attention to a brief review of the sanitary legislation which was effected at the last biennial session of our Legislature, in 1889, together with some remarks on other measures deemed of hygienic importance.

The last Biennial Report of the State Board of Health, published in the latter part of 1888, contained some quite severe reflections of the Secretary upon the neglect of the previous Legislature of the State to recognize its sanitary needs, as evidenced by its failure to pass any sanitary bills, except one appropriating \$10,000 for an emergency fund, to be used as far as necessary for excluding infectious diseases from the State. These remarks of the Secretary were resented by some of the Senators who held over and sat in the Legislature of 1889, and for a short time he was one of the best hated officials in the State. None the less, his caustic words had a salutary effect on both branches of our law makers at the last session, and we have to rejoice in an unusual number of Acts of real utility to the State. These are as follows:

Senate Bill No. 11 was an Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employés. It applies to all establishments where five or more persons are employed, and the Commissioner of the Bureau of Labor Statistics is required to enforce its provisions. The provisions mainly apply to foul effluvia, suitable water-closets separate for the sexes, ventilation, underground apartments in bad sanitary condition, mechanical contrivances for obviating of injurious gases, dust, etc., and seats for females when not required to be on their feet.

The Commissioner, Hon. J. J. Tobin, reports upon the execution of the Act as follows:

When the Act to provide for the proper sanitary condition of factories and workshops was passed, it was intended that this bureau should be supplied with the means to enforce it, consequently the appropriation was increased so that the Commissioner could employ an assistant, whose special duty would be the inspection of factories and workshops, and the enforcement of the law. The Governor vetoed this appropriation, and, as I have to continue the statistical work for which all labor bureaus have been designed, I have been obliged to confine the work of inspection to narrower limits than if otherwise provided. As you are aware, our manufacturing industry in California is very limited indeed. The sanitary condition of our factories and workshops and canneries, except where conducted by Chinese, is, on the whole, very satisfactory. I was obliged to condemn some underground workshops where women were employed as seamstresses, and cellars where bakers were making bread. In some instances, where I had doubts as to the unhealthiness of the premises, I called upon the San Francisco Board of Health, and was guided by their advice. We have not yet reached that stage of density of population and lack of room for extensive factories and workshops when capitalists will be disposed to sacrifice the health of their employés rather than incur expense. A short time ago I issued a special report on the unhealthy condition and surroundings of the cigar factories of Chinatown in San Francisco.

It is greatly to be regretted that the necessary appropriation for carrying out this Act could not be obtained. I fail to see why the Governor could consistently approve the bill to make the inspection, and then defeat its action. It is to be hoped that there will be no failure, when the opportunity again comes round, to supply the deficiency, and that a medical man may be appointed to discharge the duties. The Act, of course, applies to the whole State, and it is probable that the inspections of the Commissioner were confined to San Francisco. A thorough performance of the duties contemplated throughout the State would occupy the time of an Inspector. Were the Board of Health charged with the work, it might perhaps be carried out by its State Sanitary Inspector, provided such an officer be provided by law.

Assembly Bill No. 210 declares that "the Board of Supervisors of each county must appoint, in each incorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer," as is already provided by law, but not previously made mandatory. This Act requires the Board of Supervisors to supply the means of carrying out its provisions. In case they neglect the duties imposed on them, the State Board of Health is empowered, after July, 1889, to direct the District Attorney of the county to take the necessary legal steps to compel the Board to act, or the State Board of Health may make the appointment of the proper Sanitary Officers, and the necessary expenses shall be chargeable against the county. It is apparent that the thorough execution of this Act will result in immense gain to the sanitation of the small towns of the State; but it is too much to expect immediate appreciation of the subject by local authorities, or early accomplishment of its purposes. It is one of those laws which are in advance of public opinion, and calculated to educate the people in hygiene.

Senate Bill No. 89 provides that no human body can be interred or otherwise disposed of without a permit from some Sanitary Officer, Justice of the Peace, or Coroner; and the permit shall be issued only on production of a certificate, signed by a physician, Coroner, or two respectable citizens, setting forth the name, age, color, place of birth, occupation, date, locality, and cause of death. The permit must be filed with the County Recorder.

Such law is indispensable for a complete registration of deaths throughout the State; and as vital statistics are the foundation of public hygiene, this is the first step for a thorough system in California. Besides, it will contribute, to an important degree, in the prevention and detection of homicide. But those who are familiar with mortuary records will not be sanguine enough to expect great precision in death causes. Diagnosis is very far from being an exact science, and nomenclature is a curious function which defies the differential and integral calculus, when it involves the personal equation of the average practitioner. I shall not attempt to estimate the statistical value of certificates made by average citizens. But all things must have a beginning, and a defective one is better than none at all.

Senate Bill No. 92 requires the Trustees of the common schools throughout the State to provide facilities for the vaccination of school children, and to exclude from school all those who have not availed themselves of this provision.

This is the only practicable way of attaining compulsory vaccination

in our free country, and of course it does not reach those children who are not sent to public schools.

The local health authority should supplement the Act by systematic inspection of the schools, to see that the Act be carried out, and should provide for vaccination of pupils after an interval of not more than seven years.

Assembly Bill No. 216 provides penalties for whomever—

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,
2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,
3. Willfully interments, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without first having obtained a permit, as provided for in said chapter; or,
4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,
5. Willfully violates any of the laws of the State relating to the preservation of the public health.

This Act was needed to give vitality to legislation on those various subjects where no penalty was provided previously.

Assembly Bill No. 69 was an amendment to an existing law regarding street work in municipalities, giving the authorities due powers, and property owners suitable privileges to protect their interests. The Act is designed for the improvement of roadways and sewers, and, therefore, conducive to public health; but it is too long for analysis here.

Assembly Bill No. 75 declares it to be a misdemeanor to bring into the State any domestic animal knowingly affected with any contagious or infectious disease. As domestic animals have a clearly defined value, it may be expected that the pecuniary interests of stock owners will cause this law to be strictly executed. But the time certainly has not come when human lives can enjoy such protection against foreign infection.

Possibly the wisdom or ingenuity of the twentieth century may compass the problem of human infection, by making it a misdemeanor to communicate certain diseases, such as syphilis and smallpox.

Most of the above Acts originated with the State Board of Health. It has accomplished a great work in their enactment; but it will be a greater and more difficult achievement to have them fairly executed. Many of them are far in advance of the desires of average citizens, and never would have become laws without the active exertions of medical men in and out of the Legislature. The support and influence of medical men throughout the State, and particularly of the members of this society, are needed to preserve their vitality, to foster their growth in the public appreciation, and to bring them to a sound fruition of public benefits.

The Secretary of the State Board of Health reports upon the execution of the above Acts, as follows:

So far the working of the Act requiring burial certificates is not by any means perfect, but it is in a measure complied with wherever we have a Health Officer that does his duty.

After a few prosecutions are instituted, I think we will have more satisfactory results. The Vaccination Act has not yet been put in successful operation, pending a trial of its constitutionality, which is now in the Courts.

In regard to Sections 3062 and 3064, relating to Boards of Health (Assembly Bill No. 210), the law has been complied with in nearly every county; but as a defect existed in the draft of the law, we are unable to enforce the provisions of the law until this defect is rectified. No prosecutions for violation of any of the laws relating to sanitary matters have been instituted, for the reason that none of them are perfect enough to abide such

issue successfully. Altogether, considering their imperfection, I must say that we have made considerable sanitary progress in establishing Health Boards and Health Officers; and, if more power were intrusted to the State Board, I think that, without doubt, the law could be made efficient.

All the sanitary measures which were enacted were substantial gains to the public health. The others are more or less dependent upon the one which requires the creation of local Health Boards and Health Officers, and it will probably not be difficult to cure their defects, so that there will be no bar to their due enforcement. In my judgment, the most efficient agent for bringing about a speedy and cheerful observance of sanitary laws, would be the personal influence of a representative of the State Board of Health, acting under its instructions, and carrying its influence to all parts of the State. In any case, some time will be needed for the accomplishment of the objects aimed at.

The people must be convinced of their utility, and must witness at least partial trial of their working before they give full compliance.

The following bills designed to promote the sanitary interests of the State failed to become laws:

Assembly Bill No. 213 called for an appropriation of \$20,000 for the prevention of the introduction of contagious diseases. This was not passed, inasmuch as it was found that the unexpended balance of \$6,000, of a previous appropriation for the same purpose, is still available.

Senate Bill No. 625 provided for the appointment of a State Veterinarian and assistants, for the purpose of excluding and suppressing contagious diseases among domestic animals.

There were other bills looking to the same end, and there seemed to be a great interest in this subject among members of both branches of the Legislature. It is rather probable that if some bill could have been framed so as to harmonize the conflicting interests of different veterinarians and varying views of stock owners, it might have passed and received the Governor's approval. The existence of anthrax in various parts of the State for many years, annually recurring on the same fields, and the occasional introduction of the Texas distemper from Arizona and the Mexican State of Sonora, demonstrate ample cause for legal interference.

The State Board of Health has not decidedly craved the task of controlling animal plagues, though they clearly concern in a degree the public health; but it is not likely they would shrink from it were the duty imposed by law, together with the necessary powers and means of execution.

Assembly Bill No. 648 provided for the appointment of additional Health and Market Inspectors in cities of more than fifty thousand inhabitants. It was framed and urged to passage in both branches of the Legislature, in the interest of the San Francisco Board of Health. The Governor, however, saw fit to deny his approval, and there was no opportunity to pass it over his veto. There is no question that these additional officers are greatly needed, for the city has more than doubled in population in the last twenty years, while the plan of organization of its Board of Health has undergone no material change.

Assembly Bill No. 211 created the office of State Sanitary Inspector, and passed both branches of the Legislature with little opposition, during the closing days of the session. Unfortunately at this time the Governor had become unfriendly to the State Board of Health, and he refused

to sign the bill. Such an officer is urgently needed to enable this body to discharge the duties imposed by the Act creating it, as the following quotation shows: "The State Board of Health must place themselves in communication with the local Boards of Health, hospitals, asylums, and public institutions throughout the State, and take cognizance of the interests of health and life among the citizens generally. They must make sanitary investigations and inquiries respecting the causes of disease, especially of epidemics, the source of mortality, and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to these matters as they may deem proper for diffusion among the people. They may devise some scheme whereby medical and vital statistics of sanitary value can be obtained, and act as an Advisory Board to the State in all hygienic and medical matters, especially such as relate to the location, construction, sewerage, and administration of prisons, hospitals, asylums, and other public institutions."

How completely the advisory function of the State Board of Health in the location of public institutions has been ignored, is illustrated in the fact that members of the Board are never appointed by the Governor to serve on such a commission, nor is the Board in a general or individual capacity consulted in such matters. It is probably not attributable to want of confidence or to intentional discourtesy, but to inadvertence—possibly ignorance of the law. In view of some recent sanitary mistakes of the kind, it might be supposed that the State Board of Health would be put to some such responsibility as the law contemplates, for prudential reasons.

It is apparent that the duty of the Board toward public institutions involves repeated visitations for inspection, and they have recognized and partially carried it out themselves; but they are not paid for this work, and it costs valuable time, which the members cannot spare. The work of the Secretary (the only salaried officer) requires his almost constant presence at the Capital. Sanitary investigations into the effects of localities, employments, etc., on the public health, mean nothing less than a sanitary survey of the State, if carried out on a scope worthy of the health interests of our great commonwealth. Besides, effectual communication with local Boards of Health implies something more than the reception of sanitary reports. They need the instruction, encouragement, and personal influence of the State Board, and this involves frequent visitations and contact with its representatives. Moreover, as an Advisory Board for the location, construction, sewerage, and administration of public institutions, it was evidently contemplated by the law makers that the Board of Health should be consulted in the location of these institutions, and in the course of the construction of the buildings; but hitherto their services have not been in request, nor indeed has the Board been prepared to perform the duty, for want of a suitable officer who could be sent wherever needed.

Again, emergencies have arisen, and are liable to recur, when one or more special inspectors have been needed to ward off danger of foreign pestilence, and it has been necessary to employ such auxiliaries as could be found willing to leave their ordinary business. Surely a Health Department should be as well prepared for occasional dangers as a Fire Department.

For these reasons I confidently expect that the State Board of Health

will be allowed such an officer before the close of the next biennial session of our Legislature.

As to the sanitary needs of California, I have already alluded to a sanitary survey of the State. The importance of the work is beyond question. At the same time there is precedent for it in Illinois, where it was commenced in 1883, under the auspices of the State Board of Health. The details are carried out by local health physicians, who are sanitary officials, wherever there is a local health organization. Up to the end of 1886, nearly five hundred thousand inspections and re-inspections of premises, in about four hundred cities, towns, and villages, have been made. Thirty-four of the more important cities and towns have completed their sanitary surveys, affording data upon location, population, and climate; topography, water supply, drainage, and sewerage; streets, alleys, and public grounds; habitations, gases, and lighting; disposal of garbage and excreta; markets and food supply; slaughter houses and abattoirs; manufactories and trades; hospitals and public charities; police and prisons; fire establishments; cemeteries and burials; public health laws and regulations; municipal officials; registration and statistics of deaths and diseases; municipal sanitary expenses, and public schools. Of sanitary defects discovered by the inspection, it is estimated that 93 per cent have been corrected, and it is safe to say that the majority of these would otherwise have continued.

Although the death rate of California is lower than that of most of the States, the credit is due rather to climate than to superior sanitary provisions. The latter may be improved, but the defects must be discovered before the proper steps for amelioration can be taken.

Past experience in this State, as in others, proves that a general undertaking like this will never be carried out as a uniform plan, nor with efficiency, without direction and supervision by some recognized official.

The subject of the pollution of streams has already attracted the attention of the State Board of Health, and will be one of growing importance as the population of our cities and towns increases, for those streams must more and more be the dependence of people for household uses. The greatest harm resulting from sewerage into streams, is the pollution of water drawn from such streams for domestic purposes; but there are other evils, such as the destruction of fish, and the gradual destruction of their channels. The principal rivers of the State flow along and through so many different counties, that it will be found impracticable to find a solution of the problem in action by the local authorities, either separate or concerted; and, in the near future, our State Legislature must devise a general plan to stop the mischief. In the meantime, sanitarians must find some practicable means to dispose of the sewage and refuse of the cities and towns which have hitherto used the adjoining streams as common sewers.

In the densely populated countries of Europe, and in some of the Eastern States of the Union, the problem has been satisfactorily solved, and we have only to select the most approved plans, or those best adapted to our local conditions.

The impurities which now go to our streams are mainly the contents of the sewers and, partially, the solid garbage hauled from premises. Sewage in coastwise cities and towns flows into the sea without regard to ebb or flow of the tide, and much of it is cast back on the shore by flood tide. If the outflow is to be into the sea, it is desirable to discharge

it only during the ebb; and even this plan will not suffice for the cities fronting the bay of San Francisco.

At present the evil is not much felt, but it will be grievous when the whole shore line becomes settled to the outer heads. The interior cities must make provision for their sewage much earlier. On the continent of Europe, Dantzic was the first city, or among the first, to apply its sewage to neighboring lands by irrigation as a fertilizer, and Berlin followed the example. The Gennevilliers farm receives about one sixth of the sewage of Paris. Edinburgh makes a partial disposition of its sewage successfully in the same way. Birmingham, with a population of six hundred and twenty thousand, effectually disposes of its sewage, amounting to sixteen million gallons daily, on a tract of one thousand two hundred and twenty-seven acres. This land is under-drained at the average depth of four and one third feet, and is thus capable of receiving such an enormous outfall of sewage without offense to the senses or detriment to crops used for human consumption. Other sewage farms in Europe are thus exhibited:

Towns.	Population Furnishing Sewage.	Daily Dry Weather Sew- age—Gallons.	Acreage of Land Irrigated.	Population to each Sew- age Acre.	Nature of Soil.
Aldershot.....	8,000	-----	99	77	--- Sandy.
Bedford.....	22,000	1,000,000	155	142	--- Porous.
Breslau.....	300,000	7,707,500	741	400	--- Porous.
Croydon.....	65,000	4,700,000	450	144	--- Porous.
Dantzic.....	100,000	3,063,700	395	250	--- Porous.
Doncaster.....	24,000	600,000	200	120	--- Porous.
Leamington.....	26,000	800,000	375	69	--- Porous.
Oxford.....	41,000	1,250,000	318	128	--- Porous.
Warwick.....	12,000	1,000,000	130	92	--- Clayey.
Wimbledon.....	20,000	560,000	61	323	--- Porous.
Wrexham.....	10,000	400,000	80	125	--- Porous.

Prof. H. Robinson prepared a table of nineteen towns in Great Britain, giving the following averages: One hundred and thirty-seven people to each acre irrigated; fifty-one thousand one hundred and twenty-eight imperial gallons of sewage applied daily per acre; thirty-eight imperial gallons of sewage per capita of population daily.

Mr. H. U. McKie, City Engineer of Carlisle, England, gives these averages for various British towns: Ninety-eight people to each acre irrigated, for fifty-three towns; three thousand eight hundred and twenty-six imperial gallons of sewage daily per acre, for thirty-three towns.

For agricultural purposes one acre of land is considered sufficient to dispose of the sewage of one hundred persons. If the land be used for purification only, much less acreage will suffice.

In England the most suitable crop for sewage farms is thought to be Italian rye grass, which is fed to milch cows. This will take an enormous amount of such irrigation, with astonishing results. The first three thousand tons of sewage applied annually per acre, at intervals, gives an increase of about fifteen tons of green grass; but above this the increase is in diminishing ratio. The yield has been as high as forty tons of grass per acre per annum.

Professor Voelcker found that beets raised under irrigation gave 13.19 per cent of sugar, while the best yield in Holland, England, and Scotland, under other cultivation, is 9 to 10 per cent of sugar.

The charge of insalubrity against sewage farming is not sustained. Analysis of well water on these lands shows no organic pollution, and demonstrates the thorough filtration of waters, with combined oxidation by the growing vegetation of the matters in solution and suspension. Observation has not shown typhoid fever or diarrhœal complaints more prevalent on such lands; but it might be expected that neglect of under-drainage might be followed by malaria. Bad management of sewage tanks and accumulation of sludge without deodorization may render the system offensive, but such an evil is unnecessary.

The economic question of sewage irrigation appears to be unsettled as yet. Dr. F. W. Ford, in "Bucks' Hygiene and Public Health," remarks: "Sewage irrigation in some cases has been remunerative, but it is very doubtful whether it will ever become a valuable source of revenue to any town, however favorably situated. The question of expense is a very important one, and the system should be made profitable, or at least self-sustaining if possible; but if this cannot be brought about, the pecuniary sacrifice should be endured, in view of the great sanitary advantages of the plan."

Samuel M. Grey, C.E., of Providence, observes: "The financial results of sewage farming depend greatly upon local circumstances and management. It is said that the income from sewage farms will sometimes pay the cost of operating them. If, however, the annual expenses of interest, sinking fund, and the pumping of sewage be charged against the farm, this should not be expected."

The tract of land at Beddington (near Croydon), where sewage has been applied for twenty-six years, has risen in assessed valuation from £1 to £9 per acre. The plain of Gennevilliers, near Paris, has been converted from barren sands to fertile gardens by sewage irrigation. It is said that the Duke of Portland employs no fertilizer but sewage on his farm at Mansfield, and obtains a net return of about of \$125 an acre.

The sewage farm at Leamington is well managed and profitable with the disadvantage of a lift of one hundred and thirty-two feet. The Chairman of the Committee on Sewage for the city of Berlin, reports that the sewage farms are beginning to yield better revenue, showing a profit of 2 per cent on the outlay, and he hopes for improved results. The sewage farm adjoining Pullman, Illinois, produces cabbages, celery, and onions, and has yielded a fair profit on the investment.

We should observe that sewage is almost the only fertilizer which the Chinese have to use, from the scarcity of domestic animals, and it must contribute largely to the productiveness of a soil capable of supporting so dense a population. Dr. Tidy, of London, estimates the value of town sewage at 8 or 9 shillings per capita per annum.

Messrs. Lawes and Gilbert put it at 6s 8d, or \$1 60. Thus it appears that San Francisco annually empties into the sea matters worth at least \$500,000, if applied in the right way. Surely a part of this sum ought to be saved.

Obviously, all depends on good management. A municipality would find the plan an expensive one, but a well administered stock company or large land proprietor could operate more successfully. Any city would gladly give up its sewage with all reasonable facilities for its conveyance away.

A very valuable contribution to the discussion on sewage disposition was a paper read before the London Society of Arts on "London Sewer-

age and Sewage," by Sir Robert Rawlinson, who stated that the entire volume of London sewage is now valued at \$8,750,000 per annum.

According to this authority, land is not corrupted by sewage irrigation, but is improved, as the solids out of one hundred tons spread over one acre of land would not give a surface deposit of one one hundredth of an inch in thickness. In the discussion which followed the paper, Dr. Charles Drysdale said that all the European nations were looking to England for a solution of the question, and many of them had sent engineers over there to study what had been done. Paris had now a very successful sewage farm of one thousand five hundred acres, which produced most magnificent crops, and the effluent was so pure that any one could drink it, as he had done himself. In Berlin also, where the authorities had sent engineers to study sewage farming, they had about one thousand acres on the north and south, and not a particle of sewage was sent into the river. So far as the disposal of sewage went, every possible plan had been tried, and it is well known now, said Dr. Drysdale, that the only possible way of purifying sewage is by passing it through fitting soils.

In California, farmers have to pay for clear water, which often has to flow farther than town sewage needs to to reach suitable lands, while the latter has greater value. Apart from disposal of sewage, irrigation is less understood and less practiced in England and Germany than in California.

This fact should give us an advantage in sewage irrigation on the financial side. It is certainly time that the practice of throwing the solid garbage of cities and towns into running streams should cease. The more usual plan of dumping it upon vacant lots is less objectionable, but still is a nuisance, whether burned or left to putrefy. In various cities of England, of the Dominion of Canada, and of the United States, it has been found practicable and comparatively inexpensive to get rid of such matter by cremation in furnaces. In a paper read before the American Public Health Association in 1886, Dr. George Baird, of Wheeling, West Virginia, showed the practicability of quickly consuming night soil and carcasses of animals by a furnace costing not more than \$2,500.

Within the last five years cremation furnaces for garbage have been erected and are in successful operation at Alleghany City, Pittsburg, Chicago, Des Moines, Milwaukee, Minneapolis, Coney Island, and Montreal. At Montreal, with a population of about one hundred and fifty thousand, a contract has been made with Mr. Mann, inventor of a furnace bearing his name, to collect and cremate the garbage of the city for five years, for an annual payment of \$43,000. Families deposit their garbage twice a week in barrels on the sidewalk, where it is removed by the contractor. The cost for each household would be less than \$1 50 per annum; but in San Francisco the cost is at least twice as much to have the stuff removed to dumps where it remains a nuisance. The cost of operating the Mann furnace is estimated at 25 cents for each ton of ordinary refuse consumed, and three times as much for night soil. The Engle Destructor, used at Des Moines and Minneapolis, has been found to dispose of refuse, consisting largely of carcasses, for less than 20 cents a ton.

But these furnaces have been greatly surpassed in economy. In 1883, Mr. George Shaw erected a crematory at London, where the garbage is

dried on platforms arched over in the fashion of a reverberatory furnace. The platforms slope towards furnaces, where the dried refuse is pushed down and cremated. When once well under way, the furnaces need no other fuel, and heat enough is gained to operate a steam engine for lifting the wagons to be dumped, and to work up the residue from the furnaces into mortar with lime. By sorting over the refuse beforehand, a variety of substances may be saved, such as fragments of iron, glass, coke, cinders, bones, rags, and cork stoppers. The resulting clinker represents about one sixth of the weight of the refuse, and may be ground with lime for mortar.

The plan of Mr. Thomas D. McElchenie is perhaps still better. In the "Sanitarian," Vol. 17, 1886, he proposes to deal with household refuse by a process of fractional distillation, in retorts.

When moderately heated, melted fat may be drawn from them through cocks at the base. As the heat is raised, ammonia is given off, which is utilized. At a higher temperature, illuminating gas is produced. The remaining coke in the retorts is a good fuel, and the ashes yield some potash.

Another sanitary need of our California cities is a systematic flushing of the sewers. As the sewers have to dispose of storm waters, in addition to sewage proper, they are sufficiently washed out during the winter season, but during the long dry summer the flow is too scanty for keeping them clean of putrefactive matters, and at times the stench of sewer gas becomes overpowering. During the two or three months previous to the beginning of the rain, the effect on the public health becomes perceptible in the increase of diphtheria, typhoid fever, and diarrhœal complaints. A suitable method of flushing would be through towers or stand-pipes from seventy-five to one hundred and fifty feet in height, by means of which the sewers could be flooded successively. These same towers might also be made a very important auxiliary to the apparatus for extinguishing fires. In all coastwise cities salt water would be available, so as to not draw upon the usual supply for household uses. I am not prepared to give an estimate of the cost, but am sure that it would be moderate, in proportion to the benefits of the double service yielded. The plan of flushing with salt water is, of course, not adapted to the use of sewage for irrigation. In the latter case, it would be the duty and interest of the farm owners or sewage contractors to provide for the systematic flushing of the sewers during the dry season with fresh water. The health authorities should require it, and the water should be needed as a carrier of the fertilizer to their lands.

In all our cities, and especially in the largest, the slaughter houses come very far short of what our necessities and the first principles of civilization demand. The slaughtering of animals upon a large scale can never be carried on without the cremation of offensive nuisances, unless it is under strict sanitary supervision; and, to make this work practicable, the business must be concentrated in a very few spots, sufficiently remote from centers of population, and with facilities for water carriage of sewage. The most important large cities of the world have public abattoirs, fitted with necessary appliances for utilizing all parts of the animals, of rapid removal of refuse and sewage, and of constant cleansing, so that nothing is left to putrefy in the buildings or on the grounds. The advantages of concentration and system in the business are manifold: (1) In the utilization of much matter that goes to waste

in small establishments; (2) in diminished cost of slaughtering; (3) in avoidance of all nuisances injurious to health and offensive to smell; (4) in avoidance of those dangers and scenes shocking to humanity, which are inseparable from the business when pursued near dwellings; (5) in opportunities afforded for thorough and regular inspection of the animals before slaughtering, and of all parts used for consumption before they are offered for sale. All these advantages are positive and important, and it is to be observed that thorough inspection is out of the question under any other plan.

But right here it is proper to state that the public abattoirs have always met the strenuous opposition of stock dealers and butchers, and this is sure to be our experience in California. On the other hand, it is found that all become satisfied with the plan when accustomed to it, but it may be presumed that the pecuniary gain reconciles them to the sanitary supervision, which they would always like to dispense with.

This, however, is the feature which most concerns consumers, and should decide the matter. The experience of San Francisco within the last two years, satisfied me that the sanitary reform ought not longer to be postponed. It is the true solution of the whole difficulty, and can be effected by the determined and persistent action of the local authorities. The step means war, but it cannot long be deferred, and the difficulty will only increase by postponement. The example, once set by San Francisco, can be followed by the other cities with diminished opposition.

Allusion has already been made to the failure of a bill to increase the sanitary force of San Francisco. The subject deserves further remark, both as to its cause and consequences. With reference to the latter, I observe that the sanitary service of our metropolis has never been what it should be, and never can be, without a largely increased force.

Under the present system nuisances continue until citizens bring complaints to the Health Officer. The right way is to discover most of them by systematic and general house-to-house inspection.

All premises in the city should be visited at least once a year; many need visiting as often as once a month, and some once a week, or oftener. This plan necessitates a great increase in the number of inspecting officers, with corresponding reduction of the territory of each, and one or more additional medical officers to supervise the work. Practical sanitation is essentially missionary work. People must be visited at their homes and places of business.

Neighbors who are friendly dislike to complain of each other, and tenants dislike to report their landlords. Official inspection under authority obviates all difficulty between individuals, and forestalls most of the causes of complaint.

The defeat of the bill, which would have given partial relief to the defective sanitation of our large cities, was due to a political complication, which need not be explained here. Politics is sure to be the bane of sanitation wherever the two come in contact. Members of this society belong to both political parties, and to various religious organizations, and no discord results here, because political and religious issues are never raised, and would be instantly ruled out. Until recently the same neutrality has prevailed in the State Board of Health, and always in the State asylums for the insane.

Within the last two years there has been an intrusion of politics into

the State Board of Health, the result of which has been litigation for one of the seats and the defeat of important legislation, for want of which sanitary interests are suffering. The Governor of the State has been made the instrument of working all the mischief, but it is manifest that he has been influenced by members of the profession, as well as by others, who have less regard for public good than for personal gain. I am dispassionate on this subject, but speak plainly from a conviction that it deserves the attention of the highest medical body of the State, and in the hope that its members generally will agree with me that politics should have no more to do with the public functions of medical men than with their private practice.

Finally, I would observe that the fairest and most satisfactory plan is to give both parties as nearly as practicable equal representation in the membership of the Board, and then the same rule will be followed in the sanitary personnel. This has been the case with the State Board of Health, but unfortunately the San Francisco Board has been habitually appointed by the Governor as far as possible from his own party. Stability in organization and consistency in policy can never exist in this way. Public school teachers and policemen hold office during good behavior, and no reasonable person doubts that this plan is largely conducive to the exceptionally high qualifications of those public servants of our metropolis. What concerns the public health is not secondary in importance to the public peace or public education, and sanitary administration should be as carefully guarded against debasing influences. The public look to the medical profession for the conservation of their health interests, and it is especially our fault if they go wrong or fall short of due measure.

I desire to state here that one of my colleagues on this committee, as well as in the State Board of Health, suggests the utility of Sanitary Conventions, to be held under the auspices of the State Board of Health. The object is to arouse, in various parts of the State, an interest in public hygiene among all classes of people.

Such Conventions have been held in Michigan, Ohio, Pennsylvania, Kansas, and other States, and the proceedings embodied in the reports of their State Board of Health indicate good work in the character of the papers read, and the discussion upon the papers, and in the attendance upon the meetings. In my judgment, this proposition is worth trial, and I hope and believe that useful results would follow.

YELLOW FEVER.

By DR. DOMINGOS FREIRE, Professor in the Faculty of Medicine, Rio de Janeiro, Brazil.
Specially written for the Eleventh Biennial Report of the California State Board of Health. Translated from the original by Mr. Richard U. Clark, New York City.

I do not know of any subject so capable of attracting the attention of the medical world of both Americas as is the study of the malady which is the theme of this article.

It is the bane of the American continent, as cholera is of the continent of Asia. Besides its innumerable ways of approach, and the enormous mourning it each year leaves behind it in thousands of families, it constitutes an element of danger for those European countries in constant communication with us and the coasts of Africa, and frequently breaks up the commercial relations which exchange, between the nations, the seeds of progress and of civilization.

To point out the methods of eradicating this morbid hydra, whether by therapeutic means or by a reasonable and well founded prophylaxis, such is the end to which, with certainty and determination, sanitary authorities throughout the New World should direct their energies.

As the trans-Atlantic lines of steamers multiply, and as in each country the railroad communications become complicated networks, binding the shores to the mountain plateau, and to the interior provinces, this is a corollary of hygiene in which the epidemics of yellow fever become domiciled throughout their extensions, while alongside of the benefits of progress they receive as a baneful hostage the attacks of this terrible microbe, which at once begins its deadly work without paying any import duties upon the defenseless people.

An attentive analysis of the circumstances, the invading march of the yellow fever after its original debut, fully authorizes us to admit that induction.

In fact, coming from the Gulf of Mexico and from the Antilles, the cruel pilgrim overruns several countries of the American continent, visits Europe and Africa, ravaging Jamaica, Spain, France, the Ascension Islands, Fernando Po, and Boa Vista. Everybody knows that the epidemics of Cadiz, of 1730 and 1764, resulted from the arrival at that port of vessels from America. From Cadiz the disease was transferred to Seville by vessels. Let us recite a fact to prove this, and it would be easy to mention many others.

On arrival at the island of Boa Vista (Africa), the English ship "Eclair" showed some signs of the dread malady, which, in the twenty-three days she remained in port, carried off three hundred persons.

In Portugal, the epidemics of Oporto, 1851, and of Lisbon, 1723 and 1857, became celebrated. The latter caused six thousand eight hundred deaths in the nineteen thousand attacked by the disease, or 35.7 per cent.

France has had seven epidemics: at Brest, 1802, 1815, 1839, 1856; Marseilles, 1821; St. Nazaire and Bordeaux, 1861.

England itself, in spite of its climate, has not been able to escape from the ravages of this scourge, which seized and made victims in Southampton, 1745 and 1852, and in Norfolk, 1855.

In 1825 an epidemic broke out in Scotland. All these epidemics were imported from our continent.

America will present a grand example of civilization in arresting, through vaccination at the start, this dreadful pest. I am more than convinced that the application of prophylaxis (to which further on I shall refer) will yet suffice to obtain that result.

Notwithstanding the opposition of prejudiced and opinionated parties to the new ideas, which has already become an axiom as respects all discoveries, we have a presentiment that the facts accumulated by us by thousands, to prove the efficacy of our preventive method, will yet loudly proclaim that the grand epidemics of Mexico, Boston, New York, Philadelphia, Baltimore, Quebec, New Orleans, Jacksonville, Buenos Ayres, Montevideo, Rio Janeiro, Campinas, etc., will shortly be consigned to the domain of the dead hands of history, as was the case with the frightful devastations caused by the smallpox in Asia and in Europe before the blessed discovery of Jenner.

Referring specially to Brazil, the invasion of the first epidemic dated in 1686, was brought to Pernambuco by a vessel from St. Thomas, where the epidemic raged intensely.

The epidemic of Bahia in 1849, which passed to Rio in 1850, was imported in a vessel called the "Brazil" from New Orleans, where the disease had then many victims.

The invading march of this malady proved, by all these examples, the existence of a germ producer, transmissible by maritime routes. That it in the same manner transmits itself by land, we can prove by citing the facts which were seen in Brazil and elsewhere. We have, even last year, seen the epidemic developed at Santos, imported by railroad to the city of Campinas, Santos having been in its turn infected very probably from Rio Janeiro.

The epidemics of Cataguaires, Vassouras, Rezende, etc., cities situated on the Central Railroad, are so many examples of contagion by land routes.

The first case once appearing at any point represents the point of departure for the other cases which manifest themselves, communicating from neighborhood to neighborhood, so as to embrace entire zones of greater or less extent.

If we reflect upon the march of all epidemics of yellow fever in the different countries, we are drawn to the following conclusion: *that the yellow fever propagates itself by means of a contagious agent susceptible of reproduction always equal in point of morbid element.*

It is unnecessary to admit that this agent is a living entity, inoculating itself either directly or by the intermediary of the *circumfusa* in one organism, or it lives a parasite, fulfilling the cycle of its evolutive destiny.

Observers have been searching for this specific agent since 1494, the date of Christopher Columbus' return to Europe, who stated that "among his sailors a great many had been carried off by a disease which dyed the skin yellow like gold."

To-day, apart from the obstinacy of the skeptic, we know positively what is the productive agent of that affection, not only by means of experiments on animals, but (and it is an argument of great value) by

means of inoculation in an attenuated state of this same agent, the *inoculation* producing the same symptoms as mild yellow fever, according to the testimony of a great number of illustrious confreres, as we shall see later.

What, then, is this contagious agent?

Within the limits of a short article, I am unable to give the reader a minute description, all of which can be found elsewhere in the books which I have published on this subject.*

I will confine myself to saying that the yellow fever microbe is a *Micrococcus*, or *Cryptococcus xanthogenicus*, whose dimensions are one micromillimeter, staining well by aniline colors (violet, methyle, fuch-sine, and red cherry, color them easily). They present themselves both isolated and also in chains and in irregular agglomerations.

On examining these agglomerations in a fresh state, they imitate the configuration of certain fruits, such as raspberries, pineapples, etc., in outline.

It is necessary to observe (and I expressly insist thereon) that these agglomerations are the result of the gathering of a large number of micrococci by the aid of some glutinous intermediary matter. According to observations made by Finlay in Havana, and by myself, many micrococci envelop themselves in capsules, from which the membrane will detach itself at a given moment, as occurs with the *Tetragenus micrococci* described by Mr. Koch, and cited by Mr. Corneil (page 231, Treatise on Bacteria, second edition, 1886). Although it may be rarely that the micrococci reproduce themselves by spores, I am of the opinion that the *Micrococcus xanthogenicus* casts off spores with extraordinary fecundity. Only a little while ago, it was deemed heresy to say that micrococci could propagate by means of spores. Later it was seen that it was possible when, for example, they lived in a mass containing an insufficient quantity of nutritive matter. Finally, Mr. Prooe, in keeping with our views, has described the formation of spores in the *Micrococcus achrolencus*, a species which he has isolated from urine. It is because these observers do not remember that they are cultivating bacteriology, a new science, whereby they will little by little make laws in accordance with facts, and such laws have no birthright privileges. They may have their cradle in America as well as in old Europe. It is a curious fact that whenever a new discovery is announced in our country, it is met with a positive denial—it might be said that the good God did not make brains and eyes except for the fortunate mortals of the Old World—while they often accept without any proof the most absurd conceptions, which are not slow to recoil on the heads of those who have defended them. We must do away with these authoritative centers of scientific irradiation. *Sol lucet omnibus*. Now let us study the manner of living of the *Micrococci amaril*. It is an aerobe, dying in glass jars where it has not a sufficient provision of oxygen. It lives well at the expense of albuminoid matters. I prefer, for cultivating them, the alkalized gelatine, however; it will develop equally well in beef broth, in the serum of the blood, in peptonized fungi, agar, etc. The gelatine is by it liquefied little by little. If we inoculate the agar jelly with a drop containing these micrococci by means of platinum wire, they form

* "Microbe Doctrine of Yellow Fever and Preventive Inoculations"; Rio, 1883. "Experimental Studies on the Contagion of Yellow Fever"; Rio, 1883. See also the reports of the Ninth International Medical Congress; Washington, 1888.

colonies all along the pierced surface, in appearance like a tack, sharp at the point, growing circular at the top. The color of these colonies is at the outset white, like lead; later it forms in places yellow spots or brown points.

The colorings are very appreciable in the gelatine after it has been liquified by the micrococci; it is seen at length to take a shade more and more of yellow, at the same time it makes at the bottom of the balloon of culture a deposit of a dark color, which at length becomes black.

I have observed this singular fact, that the balloons of a large capacity are the most appropriate for the production of the pigments yellow and black.

The proof of it is that in the little Pasteur matrass and in the test tubes, in which ordinarily cultures are made, they produce very few pigments. I explain this difference by reason of the greater quantity of air contained in the larger vases. I will add that the black pigment is insoluble, the contrary of the yellow pigment. The excessive zeal of certain bacteriologists received with bad grace the news which I gave them in 1880, that the yellow fever microbes elaborate pigments in the same way as the *Mycoderma vini* makes alcohol, and that the *Bacilli amylobacter* made butyric acid.

I have never found this idea to be "bizarre," as I already knew, by reason of my reading of botanic micrography, that there exists some micro-organisms which enjoy the functions of being workers in miniature, elaborating beautiful coloring matter. Who has never heard speak of the *Micrococcus prodigiosus*, which forms spots of blood on the host* of the *Bacillus cyanogenus*, causing the color of blue milk, and of all the other little beings so patiently described by Mr. Cohn and other naturalists?

But the idea established by the bacteriologists on the announcement of my views, based upon the observation of cultures, and the coincidence of the presence of a yellow matter and another black matter in the skin, and in the matter vomited by yellow fever patients, was that there could not there exist a chromogic microbe which at the same time should be pathogic, and why? For the simple reason that they, the legislators of bacteriology, had never seen such a thing. From that came a flood of censure more or less spirituelle against the modest observer who had dared to declare a phenomenon which they had not yet admitted. But there was no great delay in the publications of the *Staphylococcus pyogenes aureus* found in the pus of boils, and which kills the animals into which it is injected. There is also, face to face before these scientists, the *Staphylococcus pyogenes citreus* found in certain abscesses—the *Oscillaria* of Laverean, accompanied by pigment, which are found again in the blood, etc. All these examples of chromogic and pathogic microbes at once confirmed my observations, although my name may rest in oblivion as the indicator of these facts.

That is the way we are discussed and criticised.

I continue, therefore, to maintain that the black matter vomited is not altered blood, but the pigment produced by the microbe we are studying, and that the jaundice of the patient is due, not to the bile, but to the yellow pigment produced by the micrococci. If you doubt that, you must also doubt it of the alcohol we drink, and which is but the

*The plant that the parasite feeds on is called the host.—Translator.

product of an alcoholic fermentation. Will it continue to be doubted, notwithstanding the production in the culture balloons of these coloring substances which may be chemically isolated, just as carmine, indigo, or other coloring matter is isolated?

Will it continue to be doubted, notwithstanding that the spectroscope refused to show any band of absorption, notwithstanding that the most delicate chemical agents are not able to reveal the least trace of iron, which is the necessary element of the blood. The experiments made in our laboratory in the presence of Dr. Cominhoa A. Cæsar Fernandes Alvarez, a physician commissioned by the Spanish Government, and some others, have been negative on this subject. Mr. Cominhoa, in his inaugural thesis, Rio, 1887, described his experiments, demonstrating positively that the blood cannot be altered in a way to produce the black coloration so characteristic of the vomited matter, under the influence, simply, of gastric juice; on the other hand, one of the most distinguished professors of the Faculty of Paris, several times cites the presence of these pigments accompanying the microbe of yellow fever. It is necessary to call attention to the fact that this professor states that I have given drawings of these pigments in my plates of the "*Micrococcus xanthogenicus*"—in fact, Mr. Comel, who is the savant to whom I refer, says, on page 529 of his *Treatise on Bacteria* (2d edition, 1886), as follows:

"In the contents of the intestines, we have found in two cases some dense masses of large round microbes of about 1mm., unequal in size, near which there always exists a yellow or brown pigment."

On page 527 of the same work he shows a drawing of the vein, showing a uriniferous tube containing some pigment, *and some small masses elongated and colored*. Messrs. Finlay, J. Jones, and many physicians who have followed me in my investigations, attest with me the existence of the pigments, both yellow and black, during the microbe culture. This, therefore, whether we wish it or not, is a fact acquired for science, and which explains in a satisfactory manner the yellow tinge—the brown and black shade of the matter vomited by yellow fever patients.

As to the existence of the micrococcus in all the well proven cases of yellow fever, I present (if perchance my affirmations are not deemed sufficient) those of Drs. Finlay, of Harvard, and of Matienzo, of Mexico (see *Dict. de Geog. Med. de Bordier*, 1884). Babes himself, who examined the kidney and liver tissue of persons who died of yellow fever (see *Compend. de la Acad. des Sciences*, Sept. 17, 1883); Girerd, Surgeon-in-Chief of the hospital at Panama; Delagado, assistant of Finlay; and Rangé, first class surgeon of the French Navy, have also made experiments which prove the transmissibility of this malady by means of cultures injected into animals. Maurel, also navy surgeon, communicated to the Society of Biology a note confirming our researches. Rebourgeon, who made complete studies at Rio and Paris on this subject.

Let us add to the testimony of these witnesses that of the Brazilian doctors, such as Drs. Cominhoa, father and son, A. Cæsar Philidory Chapot, Professor of Histology at the Faculty of Rio; Doria, and latterly Lacerda, who presented before a Medical Congress at Rio, in 1889, some preparations of microbes exactly like mine, and thus they have been proved by a comparison between them; and let us ask if the denials of our contraditors can oppose so large a number of earnest opinions.

Another very important point concerns the elaboration of correlative ptomaines with the morbid process. Such ptomaines or leucomaines are

the result of the attack of the microbes on the albuminoid matters of the serum and of the blood. These are toxic bodies, whose formation explains several symptoms of the yellow typhus, or yellow fever.

Be it permitted to me to recall that I was the first to indicate the action of the yellow fever microbe on the proteid principles of the blood, and to attach thereto the symptomatic results of their presence.

It is true that before me the presence of analogous alkaloids in certain diseases had been pointed out; however, said observations were confined to the simple statement. I went further, for I interpreted the presence of these toxic bodies, regarding them as correlative with the organization, development, and multiplication of the micro-organisms after the manner of general ferments, and I have established their influence in producing the characteristic symptoms of the most advanced degrees of the malady; employing a method analogous to that of Marino Zuco, I have extracted from the black matter vomited, two liquid ptomaines and another in the form of gas; one of the liquids, an alkali, is soluble in ether, the other is insoluble in it. The latter, mixed with water, forms a milky emulsion. Both absorb oxygen from the air, and after awhile become thick and resinous.

The ptomaine soluble in ether is oily, acrid in odor, inflammable, giving thick smoke on the approximation of a glass rod dipped in chlorhydric acid. It turns litmus—a deep blue.

Its composition per centum is carbon, 20.976; hydrogen, 15.098; nitrogen, 63.926.

The ptomaine insoluble in ether is more dense than the preceding soluble in water, and in alcohol it does not precipitate by tannin, while the former will precipitate by that reagent.

The gas transformed to a salt, gives all the reaction of an alkaloid. It does not give the Prussian blue, by the test of Boutmy and Brouardel.

These three alkalies are poisons. The gaseous ptomaine killed several frogs by producing analgesia and hemiplegia on the side opposite to that of injection.

The liquid ptomaines being injected into the veins of dogs produced remarkable disorders, affecting the functions of the pneumogastric nerve and those of great sympathetic, and besides exercising a special action on the peripheric filaments of the sensitive nerves. (See, for a full account, the communications by me presented to the National Academy of Medicine of Rio, 1885; also my book, "Doctr. Yellow Fever Microbes," 1883, Rio.) Of the treatment of the yellow fever, I will state that formerly the doctors only employed a symptomatic medication.

After I became convinced of the parasitic origin of the disease, I proposed a medication acting directly upon the etiological element. I have employed the salicylate of soda, either internally in doses of four, six, eight, ten, and twelve grammes in twenty-four hours, according to the case, or hypodermically, from thirty, forty, to fifty centigrammes to one gramme in watery solution. This treatment, after much opposition, which I have had to overcome, is to-day generally adopted by the doctors of my country. It gives magnificent results if employed at the outset of the malady. It is contraindicated in the adynamic period.

Dr. Donovan, of Jamaica, also prescribes salicylate with great confidence, as does Dr. White Walls, of the United States.

Latterly, my distinguished confrere, Dr. Wolfred Nelson, of New York, formerly of Panama, Central America, sustained by valuable considerations, counsels an acid treatment against the yellow fever, considering that the acids are unfavorable to the microbean evolution. Let my clear-headed confrere try his medicament on a large scale, for I find his ideas logical and happy.

During the epidemic of Campinas, Brazil, Dr. Angelo Simoes employed water saturated with chlorine, in doses of thirty grammes to three hundred grammes of distilled water. He reserves this for the later stages, preferring the salicylate in the first. This treatment merits a trial, like all others which aim to attack a malady through its own cause.

The prophylaxis of yellow fever was once treated at haphazard. You could choose as many prophylaxies as there were theories respecting the epidemic. To-day the thing is different; we know the place to attack. It is perfectly well known to be a contagious infection. Disinfectants and quarantines are the usual means which are to be perfected for general safety. We regard the quarantine system elaborated by Dr. Joseph Holt, of New Orleans, as the most efficacious. With advantage on this subject can be consulted Dr. Joaguire Cominha's inaugural thesis, Rio, 1886, and "Olyntho Magalhaens," Bahia, 1887.

This is also judiciously recommended by Dr. Urias in a letter which I have published this year in a pamphlet, "*Statistics of Vaccination against Yellow Fever during Epidemics; 1888-9.*" *The vaccination with attenuated virus of yellow fever by the Freire process is the most powerful hygienic resource known for the extinction of yellow fever epidemics in Brazil.*

All other means proposed to protect the health of large cities will be found useless and inefficacious without this vaccination. While having the merit of diminishing the outbreaks, they cannot prevent the attacks unless the vaccination is general, but can act in concert with it.*

Since 1883, I have employed anti-yellow fever vaccination with the most complete success, and the results are all duly authenticated by numbers of our confreres, and bright intellects of the highest repute will not doubt all these witnesses and such valuable testimony, all inspired by truth.

The attenuation of cultures is obtained by the following process: You take a drop of blood from a viscera (liver or kidney in preference) from a patient recently deceased of yellow fever, well confirmed case, or even from a well filled vein of a party who is moribund of the same malady; the drop is used as a culture in a tube of nutritive gelatine or peptonized agar jelly. When the colonies become well developed with the proper characters of evolution and purity, you pass onward by means of a first transplanting of a portion of this culture taken on the point of a platinum wire to a large balloon containing alkalized gelatine. We shall have the kind of micro-organisms of the first degree, which are the most energetic.

A drop of the first transplanting being sown, after the gelatine has totally liquefied, in another balloon containing the same substance, we shall then have a culture of the second degree, less energetic than the former; continuing these transplantings, we shall obtain cultures of the third, fourth, fifth, and sixth degrees, whose intensity will more and

*Page 34, Opus Cit.

more diminish. This rapid and easy method is preferable to the method of successive transmissions from animals, a long process and of more difficult execution. Drs. Ottoni, Caminha, Junior, and myself prepared last year some considerable quantity of vaccine by means of the first method, sufficient to serve for three thousand vaccinations, whose results were excellent, as we have already published.

The phenomena arising from the inoculation of these cultures (I generally use those of an intensity less than the third degree) are such as characterize the first stages of mild yellow fever, as has been attested by a large number of doctors (see statistics, 1888 and 1889), that is, pains in the limbs, severe pain in the spinal region, fever, temperature 38 degrees, 39 degrees, and even 40 degrees, cephalalgia, and sub-orbital pain, nausea in some cases, though more rare, vomiting, and the jaundice color, partial or entire. All these phenomena disappear without any treatment at the end of twenty-four to forty-eight hours.

The inoculation is made by means of the Pravaz syringe in the deltoid region; dose for adults, one gramme; children between ten and fifteen years, one third of a gramme; children between five and nine years, one third of a gramme; children under five years, one fourth of a gramme.

Locally, you observe hyperæmia, then a saffron yellow stain sometimes covering the entire arms.

I have already inoculated more than eleven thousand persons. Here is a brief table:

1883-84.....	418 persons.
1884-85.....	3,051 persons.
1885-86.....	3,473 persons.
1888-89.....	3,576 persons.
1889—to date in 1890.....	500 persons.
Total	11,018 persons.

I shall shortly publish the details of late statistics.

The mortality among the inoculated was .4 per cent. If we calculate the mortality, taking for normal the rate established by Jemle, in Senegal, we find the figure 66.6 per one hundred, not of .4 only, as when protected by the inoculation. The greater part were children, foreigners recently arrived, and not acclimated, nearly all being in the best receptive condition. Right alongside of them several thousand persons, who had not been inoculated, fell sick and died. Any one desirous of convincing himself will read (I trust, impartially) my works following, wherein are full statistics and all possible details:

1. Doctrine of Yellow Fever Microbes. 1883.
2. Vaccination of Yellow Fever.
3. Statistics of Vaccinations. 1885-86.
4. Statistics of Vaccinations during Epidemics. 1888-89.

Dr. Gaston's article of Atlanta, Ga., in the Journal of American Medical Association, can also be consulted with advantage. The facts there stated are so eloquent that he who would dispute them must be blinded by ignorance or passion, for figures are stubborn facts.

I invite the attention of Governments to my statistics, and venture to recall the resolution offered by the Ninth International Medical Congress at Washington in 1887, which recommended my labor to the protection of the nations. It is time to deliver humanity from one of the greatest of scourges. The effect would be a political good by pre-

senting a barrier to contamination among the nations of France, England, Belgium, Spain, Italy, Portugal, in fact, among all the countries of Europe, as many citizens of each of them die annually in the Americas of this frightful malady; moreover, we have a remedy in our hands, whose efficacy is thoroughly attested by well known physicians and persons of high social standing. I am unable to understand why we remain with folded arms before the hecatombs of yellow fever victims. Let us hope. Let us never lose faith. For myself, I am ever with the unfortunate victims, ready to help, ready to work for them, to claim their rights to life and to health.

I rely on the services of my friends everywhere, the world over, that my voice and my efforts shall everywhere be heard. A just cause ever triumphs. The victory will assuredly be ours.

RIO DE JANEIRO, BRAZIL, June 18, 1890.

SANITATION IN LOS ANGELES.

By D. G. MACGOWAN, Health Officer.

The Board of Health of the city of Los Angeles consists of five members: Hon. Henry T. Hazard, Mayor; Edward T. Wright, C.E.; Martin Hagan, M.D.; John H. Davisson, M.D.; Joseph Kurtz, M.D.

The executive force consists of a Health Officer and four Sanitary Inspectors, a Superintendent of Street Sprinkling, a Police Surgeon, and a Keeper of the Smallpox Hospital. The town has been free from all epidemic disease for more than a year. The Board has under its immediate control the sprinkling of the streets, the removal of the garbage, the removal of dead animals, and the keeping of the receiving hospital and the smallpox hospital. The department has expended directly for sanitary purposes about \$56,750 from September 1, 1889, to September 1, 1890, distributed as follows: Street sprinkling, \$31,550; removal of garbage, \$17,500; erection of receiving hospital, \$700; Health Office expenses, \$7,000.

The population of the city of Los Angeles, following the last census report, is about fifty-one thousand. The city covers thirty-six square miles of territory, and contains about two hundred and forty miles of streets, eighty miles of which are graded, graveled, and curbed, and about nine miles paved with bituminous rock, granite blocks, or finely-broken porphyry. Aligning these streets are seventy-five miles of paved sidewalks; the material used in laying them consists of cement, asphaltum, or granite. This work of paving has been principally done during the past three years, and represents an expenditure of a little more than \$1,000,000.

The first public sewer was laid in 1869, and consisted of a wooden drain which emptied into the city irrigating ditch. Soon after, in 1872, a partial interior system on certain of the main business streets was planned and laid, the material used being brick or cement, as best suited the fancy of the property owners. Some of these old cement pipe sewers are still in use and are in good condition. This system has been greatly extended during the past four years, until now twenty-five miles of the graded streets contain sewers of the best modern type and construction. All of the internal sewers recently laid have been constructed under the Vrooman Act, the materials used being vitrified salt-glazed pipe, with manholes of brick and iron, and the head of each lateral being provided with a one hundred and fifty-gallon flush tank.

These all connect with the San Pedro-Street outfall. At the southeast angle of the city limits this water is taken by the South Side Irrigation Company, and conducted through a twenty-two-inch cement pipe a distance of six miles to the sandy plains below the town of Florence. Though eagerly taken at first by the Chinese market gardeners for irrigating and enriching their truck patches, its prolonged use has been found to be a detriment, lessening the productive qualities of the land when it becomes well saturated with the sewage matters. It is a fact

that lands upon which it has been used constantly for several years have been abandoned by their cultivators, or it has been necessary to pipe pure water upon them to take the place of sewage for the purpose of irrigation.

It is eventually intended that each street shall contain a sewer, and to expedite their construction within a year, the city has voted \$374,000 in bonds for the purpose of constructing intercepting sewers to receive the discharge from the two hundred and seventy-four miles of internal sewers.

Some of these intercepting sewers are constructed of salt-glazed vitrified pipe, and the others of brick, built egg-shaped. They center at the southwestern angle of the city limits, and necessitate the construction from this point of a brick outfall five feet in diameter, whose eventual point of discharge will be the ocean in the neighborhood of the mouth of Ballona Creek, seventeen miles from the city.

Outside of the district already sewered the use of cesspools is universal. In the majority of instances these have not been constructed long enough to be offensive or prejudicial to health. On the plains the character of the underlying soil, a coarse, loose gravel, is favorable to the absorption of the waste waters and other materials discharged into the wells and vaults. In the hilly sections, however, considerable difficulty has been met with on account of the closeness of the bedrock to the surface. The records of this office show one remarkable thing, which is, that they contain the report of no case of diphtheria originating in a house connected with the public sewer system. Following the hint derived from our books, after several careful inspections of every cesspool, kitchen sink, and vault in the town by the department's Inspectors, and a careful direction of the attention of the public to these matters, together with the establishment of a state of minor quarantine in all reported cases, we are rewarded by an absolute eradication of diphtheria in our city, a case being now but rarely reported to us.

All streets accepted by the city as graded streets are sprinkled at the expense of the city. Of such there are about eighty miles. In the warmest weather it is found that this extent of street surface can be sprinkled twice a day by the use of about fifty-seven teams. These teams, with a driver, are furnished to the city at the rate of \$2 70 for a working day of eight hours. Recently the Board of Health removed the sprinkling carts from all streets paved with bituminous rock, being satisfied, after a year's comparison of the paving on Broadway, which was left unsprinkled, with the rest of the paved district, that sprinkling this pavement destroys it by rotting it where the water collects upon its uneven surfaces.

At present the garbage is removed and buried in a sandy district, remote from the center of the city. A thoroughly modern reverberatory crematory is being erected for its destruction by the contractor. The erection of this crematory has been the fruitful source of litigation, but we think we have finally disposed in the Courts of all legal hindrances to its completion.

THE ETIOLOGY AND PREVENTION OF TUBERCULOSIS.

By GEORGE MARTIN KOBER, M.D., Fort Bidwell; Modoc County correspondent.

From Dr. Billings' report on the mortality and vital statistics of the United States, as returned at the tenth census (June 1, 1880), we learn that consumption stands first upon the list of the principal causes of death; it caused twelve thousand and fifty-nine deaths in every one hundred thousand from all causes during the census year. In his Cartwright Lectures, the same author shows that the death rate from consumption, at twenty years of age and over, was 217.64 in every one thousand of deaths from known causes.

Statistics of consumption include, almost as a rule, only those who die with lung manifestations, and nothing is said of the children and others who fall victims to the tubercular meningitis, peritonitis, and other tubercular inflammations. The reports of our State Board of Health for the past twelve months show that consumption caused one thousand seven hundred and twenty-one, or, nearly one sixth of all the deaths, or an average of one hundred and forty-three deaths per month in an estimated population of seven hundred and thirty-one thousand one hundred and twenty-four.

Tuberculosis not only leads the list of diseases in order of frequency and mortality, but the loss entailed by the long duration of the disease, and the danger to others from infection, renders the subject of importance from an economic as well as a medical point of view.

The State Board of Health, through its accomplished Secretary, Dr. G. G. Tyrrell, performed, therefore, a sacred duty in calling the attention of the profession and the public to the contagiousness of this disease, and the undesirability of inviting its victims to this coast to breathe our pure air. It is strange, but true, that in pointing out the danger to life, health, and wealth, incurred by the promiscuous mingling of consumptives with healthy persons, the Board should have been attacked by heartless or thoughtless speculators, and even members of the profession, whose ignorance of well established conclusions is painfully apparent. Let us see what the one thousand seven hundred and twenty-one deaths from consumption amount to from a financial point of view:

If we assume the average duration of the disease to be two hundred days, and that \$2 per day is expended for treatment, care, and loss of work, the one thousand seven hundred and twenty-one deaths involve a loss of \$688,444 per annum, not to mention the losses and danger involved from infection to other members of the family. But does the average citizen of California care nothing for his descendants in the race of life? Would a stock raiser care to import diseased stock, however well bred? No; it would not pay him. Then, why should this glorious State be stocked with consumptives and their offsprings? Simply because we can sell a few town lots? If so, it will never pay, and the sins of the speculator "will be visited upon his children and children's children." For instead of this State producing a people with mental and bodily

vigor, courage, presence of mind, grace, and dignity, we shall have a race weak in mind and body, and deeply tainted with the predisposition to consumption.

In view of the importance of the subject, I have collected the following data from reliable sources regarding the contagiousness of consumption:

The classical researches of Koch² have established, beyond a doubt, the infectious character of tuberculosis in animals and man, whether observed in local tubercular deposits or in acute miliary tuberculosis, and that the disease is everywhere caused by a specific microbe, the *Bacillus tuberculosis*.

This bacillus has been found in the system and in all tubercular deposits, and under a high power of the microscope may be seen to consist of small, usually curved rods, which readily undergo spore-formation. A pure cultivation of these bacilli, when introduced into the body of a healthy animal, produces the disease in question.

The tubercle bacilli have not yet been observed in the soil, water, or atmosphere. Cornet,³ however, demonstrated their presence in the dust and on the walls of rooms inhabited by consumptives, and he, as well as Cadeac and Malet,⁴ successfully inoculated the germs thus found into healthy animals. Since the breath of tuberculous subjects does not contain the bacilli, we may assume that when found in rooms they originate from the sputa of patients, carelessly expectorated upon the floor, walls, carpets, etc., and which, after desiccation, becomes a constituent of the household dust.

The bacilli have also been found in the *milk* of tuberculous mothers and cows, especially when the lacteal glands were the seat of the disease, or the system infected with general tuberculosis. This last remark also applies to the presence of the bacilli in the *flesh* of animals used for food; they have also been found in the *blood* of those affected with acute miliary tuberculosis, but only in limited numbers.

Villemin states that the contagious principle has also been found in the *feces*.

According to Uffelmann,⁵ the tubercle bacillus is an obligate parasite which does not develop in the ordinary culture media, but is best propagated in blood serum, glycerine agar-agar, at a temperature of 99 degrees to 100 degrees. If the temperature is below 50 degrees or above 108 degrees, they cease to grow. The resistance of this germ to external influences, especially to heat and cold, is very great. Sormani⁶ has shown that it requires from fifteen to twenty minutes exposure to steam under pressure, or the same length of boiling, to destroy the vitality of the spores. This same author has demonstrated that completely dried and pulverized sputum retains its infectious character for weeks and months; and Pietro⁷ asserts that tubercular matter will retain its virulence ten months after drying. Putrefaction, so destructive to many bacterial forms, exerts very little influence upon the tubercle bacilli. Sormani and Voelsch⁸ claim that the vitality of the spores remained unimpaired for one hundred and eighty days in the putrefied sputum of consumptives. DeToma,⁹ however, denies this, and found that putrefaction destroys the virulence of the germs after three to nine days.

The experiments of Wesener and Falk¹⁰ appear to indicate that the bacilli of tuberculosis resist the action of the normal gastric juice.

There is much evidence to show that in man the disease is most

likely set in action by the bacilli introduced by the respiratory passages, or the digestive tract, and by the skin and mucous membranes, especially if there be a solution of continuity.

The experiments of Koch, Weichselbaum,¹¹ and others prove that artificial tuberculosis can be produced in animals by inhalation of a spray containing tubercle bacilli, by feeding animals with tuberculized food, or subjecting them to direct inoculation.

The evidence as to the transmissibility of bovine tuberculosis to man has been strengthened by Demme,¹² who reports four cases of intestinal tuberculosis in children, infected by the milk of a tuberculous cow, and adduces chemical and anatomical proof of his assertion. When we consider the large mortality of children under five years of age from primary tubercular ulceration of the intestines, tubercular peritonitis, and tabes mesenterica, and the fact that the food of these children consists largely of unboiled milk, we are strongly tempted to believe in the transmission of bovine tuberculosis through the milk supply.

Other modes of infection have been reported, viz.:

Loewenthal¹³ reports the case of a woman who slept on the right side of a tuberculous husband, and contracted a conjunctivitis of the left upper eyelid, followed by enlargement and ulceration of the glands in the parotid and submaxillary region. Excision of the original deposit revealed the presence of tubercle bacilli.

Cornil and Moore¹⁴ have shown that infection may take place through the genital mucosa, and an interesting article on chronic tubercular endometritis, referring to primary genital tuberculosis and sexual relations with tuberculous husbands, will be found in the New York Medical Record, November 30, 1889.

Lehmann¹⁵ reports ten cases in which the virus was transmitted by the mouth of a tuberculous Rabbi, who was in the habit of applying suction to the wound after circumcision. In these cases at the end of the second week ulcerations with a gray base were noticed at the point of infection; four of the children died shortly from tubercular meningitis; three others after a more prolonged illness; one died from diphtheria, and two recovered.

Eisenberg¹⁶ reports a similar case, in which the sputum of the Rabbi was found to contain the bacilli. Tehernig, Pfeiffer, and Duering have reported instances of infection through the skin, in one case by means of expectorated phthisical blood, which infected a slight hand wound of a girl. Landouzy and Martin¹⁷ have shown that inoculation of the spermatic fluid from tuberculous guinea pigs produced the disease in one third of the animals experimented upon. This would seem to render the transmission of the disease through the sperma highly probable.

From what has been said and written on the subject, it is evident that the tubercle bacilli must be widely scattered; the modes of invasion are also numerous, and the wonder is that, relatively, only a few of those exposed to the virus actually contract the disease. This shows that invasion of these microbes is not sufficient to produce the disease, but they must also find a susceptible subject for their proliferation and pathogenic effects.

The question of susceptibility in this, as in other infectious diseases, evidently plays an important role. But what is that state of the body which renders it peculiarly liable to be affected injuriously by this morbid agent? Is it a weakness of the organisms, a diminished power of

resistance, or is it a peculiarity of the tissues, more especially of the cells, which places them at a disadvantage in their struggle against the invasion and effects of these bacilli? Is it the addition or subtraction of a certain something in the blood which furnishes a suitable pabulum for their growth? These are difficult questions to answer.

Clinical experience indicates that faulty nutrition, debility, loss of blood, anæmia, mental anxiety, diabetes, whooping-cough, measles, and other diseases, favor the development of tuberculosis. We also know that a predisposition may be inherited, as evidenced by a delicate physique, narrow chest, and general vulnerability of the tissues.

A vulnerability of the tissues to the disease may also be acquired by dust-producing occupations, and here the origin of the dust seems less important than the character of the particles which compose it. For this reason, no doubt, the hard, sharp, and angular particles of iron and stone dust are more liable to produce lesions of the respiratory mucosa, thus favoring the invasion of the bacilli. In no other way can we explain the comparative innocuity of coal dust, the particles of which are quite free from sharp points and corners. Dr. Ogle has shown in his report, in forty-fifth annual report of the Registrar-General, that coal miners stand at the head of the list as regards freedom from phthisis and other lung diseases, in dust-inhaling occupations. We know, of course, that occupations involving the inhalation of an unusual amount of dust tend to produce diseases of the lungs; not necessarily tubercular, but what I wish to emphasize is, that certain dust particles are apt to cause lesions of the respiratory mucosa, and hence an increased susceptibility to the invasion of the tubercle bacilli.

Uffelmann believes that what we call inherited or acquired predisposition to tuberculosis may amount, in many instances, only to a local predisposition of the respiratory passages, a weakness of the membranes, and greater vulnerability, and refers to the fact that some individuals, otherwise healthy, show a greater liability to laryngeal and bronchial catarrhs, and later to tuberculosis, whilst in others repeated attacks of tonsillitis predispose to diphtheria.

The observations of Dr. Bowditch, of Boston, and Buchanan, of England, positively indicate that damp soils and habitations are predisposing causes to tuberculosis, and whilst this relation has not been satisfactorily explained, still it is possible that the bacilli of tuberculosis luxuriate best in such an atmosphere, as damp rooms are much more likely to contain an excess of organic matter. Another explanation may be found in the well established fact that a damp air predisposes to catarrhal affections, or "colds," and these in turn may render the system more susceptible to the invasion of the tubercle bacilli.

As in other infectious diseases, the question as to whether the germs are introduced *direct*, and in sufficient numbers, is of importance. It would appear that the mere presence in the sick chamber does not convey the virus, but it requires intimate contact, as sleeping in the same bed or room, common use of eating and drinking utensils, mouth to mouth contact, etc.

The observations of Humphrey, Pollock, and Leudet, conclusively show that in well ventilated wards of chest and consumption hospitals, the disease is not usually found to spread.

In private practice the results are different in this respect. A French committee of investigation presents two hundred and thirteen cases of

tuberculosis in which the communicability of the disease was clearly established. In sixty-four of these cases the disease was conveyed from husband to wife; in forty-three from the wife to the husband; in thirty-eight it was transmitted to brothers or sisters; in nineteen from parents to the children; in sixteen to distant relatives; and in thirty-two to outsiders. The communicability was most marked among the poorer classes. Another collective investigation of a German medical society revealed the fact that of nine hundred and thirty-eight married persons who died of acquired tuberculosis, in one hundred and one instances either the husband or wife also contracted the disease. In 8.1 per cent of these cases the husband contracted the disease from his wife, and in 13.2 per cent the wife was infected from the husband. Other statistics might be adduced in favor of the communicability of the disease, but Zasetzky's¹⁸ observation is of special interest. He reports the case of a tuberculous woman who married between 1872 and 1883 three husbands, all previously healthy; the first husband died in 1879 of tuberculosis, the second in 1881, and the third husband, at the time of the report in 1884, was also a victim of the disease, the wife having in the meantime died of consumption.

We can only explain the greater contagiousness in such cases by a more intimate contact, the occupation of the same room and bed, common use of eating and drinking utensils, and the vitiated air of private rooms. It is very possible that the bacilli may acquire more virulent infective powers in the foul atmosphere of overcrowded rooms, and, as suggested by Dr. Ransome, the sporulation of the bacilli may be assisted by contact with the kind of organic matter found in such atmospheres. We will now consider the various ways in which the bacilli are most likely to gain access into the system.

Cadeac and Malet have proved that the bacilli are not contained in the breath of tuberculous patients; we must conclude, therefore, that when found in the air of rooms occupied by phthisical patients, they originate from the dried sputum and other dejections on floors, walls, carpets, bedding, and clothing, which are converted into dust particles, and thus gain access into the air and the respiratory tract. The virus may also be conveyed to others, by small particles of sputum, in kissing, coughing, instrumental manipulations, or adhering to utensils in common use.

Uffelmann believes that the secondary lesions of the alimentary tract may be produced by the patient's swallowing a portion of the expectoration. The most common source of infection of this tract, by means of unboiled milk and insufficiently cooked meat from animals affected with tuberculosis, has already been referred to. There is no evidence to show that the bacilli are transmitted in vaccination; in fact, Acker failed to discover the microbes in question in the lymph vesicles of vaccinated phthisical subjects.

There is much reason for believing that the germs of the disease may be conveyed in clothing. I remember a well authenticated instance where a perfectly healthy man bought the clothing worn by a consumptive, and contracted the disease within six months, and died from the effects two years thereafter. Perlen,¹⁹ in his dissertation on pulmonary tuberculosis and occupation, tells us that of four thousand one hundred and seventy-seven tuberculous patients treated in the Munich Poliklinik, seven hundred and nine were engaged in tailoring, cleansing, and shoe

shops. Whilst these figures are suggestive, it is of course impossible to estimate the number of instances in which the disease was spread by dried sputum contained in clothing.

Does climate afford immunity from tuberculosis? The evidence is not sufficient to show that any community in any climate is entirely free from pulmonary consumption, but we do know that whilst the mortality on the plains and in the valleys of Europe is about three per one thousand, and as high as five to seven per one thousand living in cities and towns, the inhabitants of certain mountainous districts, even under unfavorable sanitary surroundings, suffer to a far less extent—the mortality amounting in some localities at an elevation of fifteen hundred feet, to only 0.56 and 0.68 per one thousand.

Fuchs, quoted by Uffelmann, gives the following elevations as likely to afford immunity from consumption:

In the north temperate zones, at an elevation of.....	1,300– 3,000 feet.
In the middle temperate zones, at an elevation of.....	2,000– 5,000 feet.
In the tropical zones, at an elevation of.....	7,000–14,000 feet.

Bell, in speaking of our own country, refers favorably to the eastern highlands, the Alleghany region of Georgia, the Carolinas, Tennessee, Virginia, West Virginia, Pennsylvania, and the White Mountains, especially the pine forest region of the Atlantic States, from Virginia south-erly, at an altitude of from five hundred to fifteen hundred feet, and also the Pacific Coast, as notable regions for the small ratio of deaths from pulmonary diseases. In 1886 I called attention to the climate of Northern California, and the infrequency of pneumonia and phthisis among the inhabitants of Modoc County, suggesting, in my concluding observations, that the great daily range of temperature, dry atmosphere, and elevation (four thousand seven hundred feet) might be fatal to the development of the tubercle bacillus (see Ninth Biennial Report of State Board of Health, 1886). In this connection it is proper to refer to the fact that M. Delargy, in a paper quoted by Dr. G. G. Tyrrell, Secretary State Board of Health of California, December, 1889, points out that certain mountain regions in Europe, formerly exempt from phthisis, have now become infected since intercourse with cities and phthisical localities have been furnished, and believes that the presence of phthisical patients in the most healthful localities will soon affect the purity of the atmosphere.

We have seen that the elevation affording immunity differs greatly in different zones; therefore, exemption cannot be attributed to the influence of diminished atmospheric pressure alone, although we must admit that diminished density of the air induces deeper inspirations, more effectual inflation and ventilation of the air vesicles, which naturally tend to increase the resistance of the pulmonary tissues to the invasion of the germs. It is possible that freedom from organic impurities in the air is the most important factor. Pasteur, Tyndall, and others have shown that the air of great altitudes is entirely free from organic impurities; and Miquel, Frankland, Petri, and others have examined the air for bacteria at different altitudes, and found the air at an elevation of between six thousand and seven thousand feet to be quite free from germs.

Miquel found in one cubic meter:

1. At an elevation of 2,000-4,000 metres	none.
2. On the Lake of Thun, 560 metres.....	8.0
3. Near the Hotel Bellevue at Thun, 560 metres.....	25.0
4. In a room of the Hotel Bellevue at Thun, 560 metres.....	600.0
5. In the Park of Montsouris, near Paris.....	7,600.0
6. In the City of Paris (Rue de Rivoli).....	55,000.0

Similar investigations have been made of the air of sea coasts and the high seas.

Uffelmann found between fifty to three hundred bacteria in one cubic meter of air on the Baltic Coast, in the summer of 1887, and Moreau, Miquel, and Fisher ascertained that the sea air one hundred and twenty miles off the coast is absolutely free from bacteria. These facts throw a flood of light on Bowdin's statistics, which show that whilst the deaths from consumption in the English army were 10.7 per thousand, the mortality in the navy was only 1.76 in one thousand men.

PREVENTION OF TUBERCULOSIS.²⁰

The facts presented in the foregoing pages justify the conclusion:

1. That tuberculosis is an infectious disease caused by a microbe, transmissible to healthy individuals under certain favorable conditions.

2. Inherited and acquired predisposition play an important role in the invasion and multiplication of the bacilli.

3. The germs may enter the system by the respiratory and alimentary passages, and by the skin and mucous membranes, if there be an abrasion.

4. That whilst the bacillus has been transmitted through the milk, flesh, and blood of animals and man, the most common and effective way of distributing the disease is by the dried and pulverized sputum of tuberculous patients. Heller calculates that seven thousand two hundred millions of bacilli may be expectorated in a day by a single patient.

The indications for the prevention of this disease are plain:

The sputum of consumptives should be received in spitecups containing a 5 per cent solution of carbolic acid, and the contents rendered innocuous by boiling for twenty minutes. The paper and wood boxes made for this purpose should be burned. All public and private buildings should be provided with spittoons.

Patients who continue out of doors should use handkerchiefs to receive their expectoration, which, if old, should be burned; at all events, linen, bedding, or clothing thus soiled should not be allowed to dry, but must be thoroughly disinfected, boiled, or steamed.

Notification and disinfection in all fatal cases should be made compulsory, and the rooms in hotels, or elsewhere, where consumptives may take lodging, should be so arranged that thorough disinfection is practicable, and all articles with which the patients have had anything to do should not be used by others, until disinfected by steam under pressure, boiling sulphur vapor, or coating with lime or corrosive sublimate solution.

Isolation of tuberculous patients is indicated in hospitals, asylums, and prisons. In private life the patient ought to occupy a separate room and bed, use separate eating and cooking utensils, and neither receive nor give kisses.

Whilst it may be exceedingly disagreeable to be the advocate instead of referee in matters pertaining to "preventive medicine," still it will always be the duty of the family physician to enlighten the public on the nature of infectious diseases and the means for their prevention, until the facts are commonly recognized. Marriages with a tuberculous person should, of course, be discouraged.

Special attention should be given to the meat and milk supply. Compulsory reporting of cases of bovine tuberculosis should be enacted, and the sale of diseased meats and milk prohibited. In the absence of such laws, or as an additional precaution, cow's milk should be thoroughly boiled and meats well cooked. Beef's blood should never be drank, as suggested some years ago. A tuberculous mother should not nurse her infant; and great care must be taken in the selection of a wet nurse.

Predisposed subjects should take special precautions; this is especially true of those born of tuberculous parents, or belonging to consumptive families; those debilitated by privations or excesses, and those suffering or recovering from whooping-cough, measles, smallpox, and diabetes. Scrofula should also be included, but many physicians regard this disease as identical with localized tuberculosis. Clinical experience points to the fact that the blood or tissue cells of all such persons have not the power to resist the incursion and effects of the bacilli, and that it is quite possible to increase this resistance by improving the tone and general nutrition of the system.

Apart from medication, careful and methodical gymnastics, attention to the skin, and other hygienic rules may prove of special value.

The establishment of sanitary boarding schools, in salubrious localities, for children predisposed to tuberculosis, in which special attention is paid to their physical culture, appears earnestly called for.

In choosing a vocation for such persons it is important to avoid occupations involving sedentary habits and indoor work, especially in a dusty atmosphere. Last, but not least, let us insist on the purity of the air in our houses and towns, and guard against damp and unsanitary habitations.

¹ Billings, J. S. Cartwright Lectures, N. Y. Med. Records; December 14, 1889.

² Koch, R. Mittheil: aus dem k. Gesundheitsamte, II.

³ Cornet. Zeitschr. f. Hygiene, V, 191.

⁴ Cadeac & Malet. Rev. de Médecine; 1887, No. 7.

⁵ Uffelmann, J. Handbuch der Hygiene, p. 530; 1890.

⁶ Sormani, quoted by Uffelmann.

⁷ Pietro, quoted by California Health Board; November, 1889.

⁸ Voelsch, in Ziegler's Beiträgen zur pathol. anatomie, II 2.

⁹ De Toma. Centralblatt f. d. med. Wissen, 1888.

¹⁰ Falk. Virchows archiv, 93.

¹¹ Weichselbaum. Zeitschr: der Wiener arzte, 1883. 2 Heft.

¹² Demme. Jahresbericht des Jennerschen Kinderspitals. Bern, 1882.

¹³ Lowenthal. Impftuberculose der Conjunctiva, 1887.

¹⁴ Moore. Pacific Record; November 15, 1888.

¹⁵ Lehmann. Deutsche Med. Wochenschr; 1886; Nos. 9 and 10.

¹⁶ Eisenberg. Berlin klin Wochenschr; 1886; No. 35.

¹⁷ Landouzy & Martin, in Verneuil Etudes exper. et cliniques. Paris, 1887.

¹⁸ Zaszetzky. Wrutsky; 1884.

¹⁹ Perlen. Lungenschwindsucht und Leruf. München, 1887.

²⁰ American Jour. of Med. Sciences; January, 1890; pp. 78-79.

AN ECONOMIC VIEW OF SANITATION.

By S. S. HERRICK, M.D.

Under this title it is proposed to sustain a claim for public hygiene by mathematical proofs derived from actual results. It will be shown what sanitation has accomplished in the prevention of disease, the rescue of human life, and the conservation of wealth; what room is left for advance in the same direction; and why its cost, as an investment, promises more substantial returns than any other public expenditure.

COST OF SICKNESS AND DEATH.

A very moderate estimate of the value of a human life during the productive period, averaging from twenty to sixty years of age, would be \$1,000 as capital for the production of wealth. About half of the living population fall within these limits, so that the average value of a human life may be set at \$500. The British Board of Health has estimated one hundred and twenty thousand deaths annually from preventable diseases out of thirty-five millions of people in the United Kingdom, and one million two hundred thousand cases of serious preventable sickness. With the value of lives as above stated, and an average cost of every case of illness at \$30, including medical attention, medicines, loss of time, and funeral expenses of the dead, the total loss would amount to \$96,000,000 annually. Dr. J. S. Billings, writing in 1878 on the basis of the United States census, reckoned one hundred thousand deaths occurring annually in this country from preventable causes, and one hundred and fifty thousand constantly sick of preventable diseases. The cost of this needless loss of life would be \$50,000,000; and supposing the average earnings of every person in the productive half of life to be \$1 per day for three hundred working days, there would be a daily loss of \$75,000 in wages, amounting to \$22,500,000 for the year. The care of the sick at 50 cents per diem for three hundred and sixty-five days would amount to \$27,375,000; the cost of the funerals, at \$20 each, would be \$2,000,000; and the total damage to the wealth of the country would exceed \$100,000,000 annually. Allowing for increase in population between 1870 and 1890, the present loss would be more than \$150,000,000.

Dr. J. H. Kellogg, of Michigan, by a different mode of calculation, estimated the annual damage to the United States from preventable disease at not less than \$300,000,000.

Another calculation would reach substantially the same result. It is supposed that for every death in a given population there are two years of sickness distributed among those who die and those who recover, equivalent to seven hundred and thirty days of disability for work. In this country, an average day's labor is worth at least \$1, and half the sick are in the productive period of life. Allowing three hundred working days to the year, every death involves a loss of pro-

duction equal to \$150. The cost of seven hundred and thirty days of sickness for maintenance, medical attention, and medicines, would be moderately put at 50 cents a day, or \$365; the loss of capital for every death would be \$500; and, without counting expense of funerals, the total loss to the community for every death would exceed \$1,000. Therefore, allowing for the whole country one hundred and fifty thousand deaths annually from preventable causes, there is a loss of more than \$150,000,000. If California holds, as is probable, one fiftieth of the population of the Union, her share of the loss would be \$3,000,000; for, though we may claim a lower mortality than the average of the country, this would have an offset by higher wages and capital value of life in the Golden State.

For a single illustration, the yellow fever epidemic of 1878 may be adduced, which prevailed over the greater part of the Mississippi Valley, and which was traced to faulty administration of the quarantine near the mouth of the river. Mr. Keating, of Memphis, estimated its total damage to the valley at not less than \$200,000,000, including the value of eighteen thousand lives lost, the cost of as many funerals, the expense of one hundred and twenty-five thousand cases of sickness, the loss of time and maintenance of fifty thousand refugees, the interruption of productive industries, and more or less permanent diversion of commerce. It is probable that the losses of New Orleans alone during the present century have exceeded the above amount from this single cause, over which modern sanitation may now claim to have won mastery.

HOW MUCH CAN STILL BE PREVENTED AND SAVED.

Notwithstanding the great advances in hygiene and corresponding lowering of mortality in the most civilized countries of the world, especially in the last quarter of a century, sanitarians hold that improved methods are capable of still further reducing sickness and death by one third. It is asserted by Thomas Bond, Assistant Surgeon of Westminster Hospital, London, that, on an average, half the out-patients treated by a hospital surgeon suffer from diseases due primarily to want of knowledge of the laws of health, chiefly in regard to dress, ablutions, and ventilation. Under the preceding head we have seen that the annual loss to the whole country from preventable disease is not less than \$150,000,000. It is fair to presume that efficient sanitary measures in competent hands might in time save most of this enormous expense. It must not be expected that such improvements could be immediately effected. True and lasting reforms in hygiene, as in other matters affecting the public welfare, are largely experimental and must be accomplished gradually.

It is within reasonable bounds, however, to assert that practicable improvements in hygienic methods ought speedily to reduce the mortality one half in such diseases as erysipelas, smallpox, scarlatina, diphtheria, typhoid, puerperal, and the malarial fevers; and one fourth in pulmonary consumption, measles, whooping-cough, diarrhœa, dysentery, cholera morbus, and cholera infantum. Such would be the effect of thorough drainage and cultivation of the eucalyptus globulus on wet lands; of the destruction of the contagious products of diphtheria, pulmonary consumption, typhoid fever, and the diarrhœal diseases, and the isolation of those affected with contagious diseases. Dr. H. B.

Baker, Secretary of the Michigan State Board of Health, avers that it is practicable to reduce the sickness and mortality of his State 10 per cent by improved sanitation.

EXAMPLES OF RECENT SANITARY GAINS.

It has been asserted by Mr. Schultz, of New York, that quarantine restrictions at that port, interrupting traffic in rags and hides during the summer months from 1822 to 1840, entailed a loss of \$100,000,000 to manufacturers and consumers—a sum sufficient to support all the Health Boards in the country. This loss, however, was less than would have resulted from the admission of yellow fever, smallpox, and cholera. Under improved quarantine methods the impediments are so far removed that this traffic suffers no serious damage. The amelioration of traffic in other commodities is to be added to the above estimate, and this is then to be increased by due allowance for other ports. These increments would more than double the amount, aside from the fact that the foreign commerce of the country has more than doubled since 1840. It is therefore probable that improvements in quarantine methods since 1822 have resulted in a saving of at least \$25,000,000 annually to the commerce of the country, for no reasonable person would say that quarantine was needless.

The following table shows the hygienic advance made in several European countries between 1865 and 1883:

COUNTRY.	RATE OF MORTALITY PER 1,000.			
	1865.	1875.	1882-3.	Gain in Seven Years.
Bavaria	30.7	31.4	28.5	2.9
Italy	29.8	30.7	27.4	3.3
France	23.6	23.7	22.2	1.5
Belgium	26.5	22.7	20.8	1.9
Switzerland		24.0	20.3	3.7
England	23.2	22.2	19.6	3.2

In sanitation Great Britain holds undisputed precedence. The civil registration of vital statistics began in 1837. The annual death rate of the period 1837-71 was nearly stationary—about 22.3—except when temporarily augmented by influenza or cholera. The Public Health Act went into effect in 1872, and was amended in 1875. The sequence in mortality is thus exhibited:

Mean death rate per 1,000, 1871-75	22.0
Mean death rate per 1,000, 1876-80	20.8
Death rate per 1,000, 1881	18.9
Death rate per 1,000, 1882	19.6

The decrease of mortality has been greater among females than males. There has been a decline for every decennial period of life in males, except those from 35 to 75, and in females for all periods, except from 55 to 75. Dr. Farr's life table gave the average expectation of life for males as 39.91 years, and for females as 41.85 years. Under the table revised since 1880, it is for males 41.92 years, and for females 45.25. So there has been a gain of 5 per cent for males, and 8 per cent for females, as

acknowledged by life insurance actuaries. Although the male mortality from 35 to 75 years has slightly increased, and that of females from 55 to 75 years, the decrease at earlier periods has been so much greater that, of one thousand persons born alive, there are more survivors at all periods of life now than formerly. Among males 70 per cent, and among females 65 per cent of the increased duration of life come between 20 and 60 years—the productive period of life.

A report to the Privy Council of Great Britain states that in thirteen of the principal towns the average death rate, previous to the introduction of sewerage, was 28.4 per 1,000; subsequently, 23.4. Between 1870 and 1880 the death rate has declined from 24.4 to 22.8 per 1,000.

In the Crimean war the losses of British troops by sickness, due to bad quarters and food and insufficient clothing, were six times those due to casualties of battle. Under improved hygiene, carried out by efficient medical officers, the death rate of British troops in India has been reduced from 69 per 1,000 in 1860, to 17.62 in 1880; and of British troops in Europe, from 17.9 in 1860, to 8.56 in 1880. From cholera the death rate among European soldiers in India was 9.02 per 1,000, annually, in the period 1861–5; in the period 1876–7, .84. In the cholera epidemic of 1876, the death rate among the native population from this disease was 12.12 per 1,000; among native troops, 2.2; and among European troops, 1.85 per 1,000. In India the mean mortality from fevers, 1859–67, was 22.41 per 1,000; 1868–76, 3.29, and in 1876, 1.26 per 1,000. This immense reduction was due much more to preventive than curative improvements.

In Manchester the death rate was three less per thousand in the period 1873–79 than 1866–72, and in Liverpool six less. In 1859 pure water from Loch Katrine was brought to Glasgow, the previous supply having been from the Clyde. In three cholera epidemics prior to 1859, there were more than three thousand deaths from cholera. Since 1859 only sixty-eight have died of cholera, though the population has immensely increased. This sanitary improvement, supplemented by better dwellings, better hospital accommodations, and more efficient control of epidemic diseases, has reduced the death rate 11 per cent in twelve years. Besides, Edinburgh has eliminated 14 per cent of her mortality; Dundee, 12 per cent, and Aberdeen (having previously a low death rate), $3\frac{1}{2}$ per cent. The leading English cities and towns show a less marked, but uniform gain in vitality.

The annual saving of children's lives in England since 1860 is estimated at ten thousand, due to purer air and water, better housing, food, and clothing, and more intelligent care. The deaths from continued fever were one thousand one hundred per one million persons living in 1865; and four hundred in 1880. Since vaccination became compulsory, deaths from smallpox average two hundred and sixteen per one million, annually; about one fourteenth of what occurred in the last century.

At Vienna, in 1872, typhoid fever caused six hundred and thirty-five deaths, and in 1873, six hundred and forty-nine deaths. A new water supply was followed by a reduction to three hundred and fourteen deaths from that cause, which was still further lowered to sixty-nine in 1884, to eighty in 1885, and sixty-one in 1886.

The "Metropolitan Association for Improving Dwellings of the Industrious Classes," in London, has erected one thousand and sixty houses,

having accommodations for five thousand three hundred people. During the eight years prior to 1875, the mortality in these houses did not exceed fourteen per one thousand, while the general rate in the metropolis at the same time exceeded twenty-four per one thousand, though the improved houses contained an unusually large proportion of children.

The following attempts in household and town sanitation in this country will serve as models: "The Association for Improving the Dwellings of the Poor in New York City" has built a block of houses on First Avenue, which accommodates two hundred and eighteen families at a moderate rental. They are provided with reading-rooms, a bath house, and an ample playground for children. The plumbing was not faultless, but in 1882 the death rate among the children in this block was six per one thousand, while it was twenty-eight per one thousand in the neighboring houses. The city of Pullman, located on a level plain twelve miles from Chicago, was founded by the well known inventor of the sleeping-car, in 1881. The fact that its sewage farm more than paid expenses and interest on cost within two years, proves that the management has been according to business principles. In two years its population had grown to seven thousand five hundred, and for this period its death rate was 6.9 per one thousand, annually. At the same time, the death rate of the adjoining village of Hyde Park and some contiguous rural territory, was fifteen per one thousand, annually. But the advantage of these enlightened sanitary improvements accrue not merely to a lowering of sickness and mortality, with their attendant impoverishment and grief. With greater conveniences of life and more cheerful environment, we find more leisure for social enjoyment and content, the summit of happiness.

SANITARY CONDITIONS OF EARLIER TIMES.

On this point I cannot do better than to quote *in extenso* from an address by Prof. S. E. Chaillé, M.D., of New Orleans. His statements are based on authentic history:

Mankind must not be permitted to forget what were the conditions of their existence about three hundred years ago. * * * Then the "black death," the plague, the sweating sickness, the jail fever, scurvy, smallpox, syphilis, and other virulent diseases, caused such frightful ravages that this generation may well stand aghast. The blessings due to the total disappearance or great diminution of these diseases are inestimable. * * * Our best historians report that, at that period, the vast majority of our ancestors—namely, the common people—were subjected to the following conditions of existence:

War, Famine, and Pestilence.—Incessant wars increased the frequency of famines; these aggravated pestilences; the poisons of these, scattered broadcast by those unsurpassed diffusers, marching armies and marauding soldiers, produced a pandemicsity and continuity of spreading diseases to an extent which kept the people wretched, degraded, and "thinned out."

Wages.—Macaulay states that, only two hundred years ago, after great social progress, the wages of the common people in England barely averaged \$1 to \$1 50 per week, without board; that nearly all the prime necessities of life were dearer then than now; and that one fifth of the total population were helped to live by the public poor-rates.

Malaria in the Country.—England had fens forty or fifty miles in length, reeking with miasm and fever, and inhabited by "ague-stricken peasants."

Streets.—In towns the streets were filthy beyond expression. After nightfall a passenger went at his peril, for chamber windows were opened and slop pails were unceremoniously emptied down. The streets were infested with swarms of domestic animals; were destitute of lamps. Some were only six feet wide, and many were too narrow for a cart to pass. Crooked, unpaved, filled with rotting vegetables, animals, and offal, they were "very unsavory as well as very filthy."

Houses.—The houses of the common people were "made of reeds or sticks, plastered over with mud." "The fire was chimneyless," and from the fireplace "smoke escaped as best it could, without the help of chimneys, for these, though introduced in the twelfth century, were but slowly acclimatized." The dark, ill-planned houses, cut off from fresh air and sunlight, had "no windows of glass, nor even of oiled paper," and it was not

until the first half of the eighteenth century that house ventilation began to excite some attention. The rooms had mud floors, "covered with straw, sedge, or reeds, and rarely with tiles or slates." Even of the palace of Greenwich it is stated that, "though fresh rushes were supplied from time to time, there would remain, sometimes for twenty years together, a substratum of the most nauseous and disgusting description, and it appears from earlier accounts and from certain civic restrictions and regulations, that this loathsome mess was at length turned out into the narrow streets, to be consumed by dogs, cats, pigs, and poultry, or imperfectly washed away by the rain." In the country "houses, stables, and offices were under one roof," and even the country gentleman had "the litter of the farmyard gathered under the windows of his bed-chamber." "The prisons were hells on earth—seminaries of every crime and every disease." Filled in the largest part with debtors, these were so crowded together that an allowance of only one hundred and fifty cubic feet to each was common. No bedding—not even straw—was provided, and those who procured straw often used it until "almost worn to dust," while "some laid on rags, some on the bare floors. The prison-rooms were without fireplace or sewer, and so extremely offensive that those who tarried in them stunk for hours. In fine, the crowded debtors' prisons presented an unparalleled combination of physical and moral evils—a seething mass of crime, misfortune, low vice, and debauchery," and so continued until John Howard's day—about 1774.

Bedding and Clothing.—The common people slept on piles of straw, on straw pallets or rough mats, and even the townsman's "bed was a bag of straw, with a fair, round log for his pillow." "The sheep's skin was in common use as clothing," but, "if a man was in easy circumstances, his clothing was of leather, while if poor, a wisp of straw wrapped around his limbs kept off the cold." "Vermin abounded in the clothing and beds." Only in modern times, and by very slow degrees, did "articles of cotton and linen come into use as clothing worn next to the skin, easily cleaned and readily changed, and soap, soda, and potash find their way into every house as abstergers." In those good old days personal uncleanness, even a religion with some, was unavoidable with the many, so that even the plumed knights and noble gentlemen (so often envied by the callow youths of our day) were forced to resort to the strongest perfumes to enable them to endure a congregation of themselves.

Diet.—"There was no commerce to put off famine," which frequently occurred. "The common food was pease, vetches, fernroots, and even the bark of trees." If the rural population were "able to procure fresh meat once a week, they were considered to be in prosperous circumstances; and one half the families in England could hardly do that." The chief animal food was salt meat. Rye bread was used instead of wheat; vegetables were uncommon articles of food; and even the potato was very slowly introduced by modern civilization. Drunkenness in England was universal; to drink until literally "under the table" was a common habit. Only within recent times, and very slowly, have tea, coffee, chocolate, and tobacco been introduced into common use, supplanting in some measure the excessive abuse of beer and ardent spirits.

Licentiousness.—The fearful spread of syphilis demonstrated the secret wickedness of society and the frightful immorality of the times. "If contemporary authors are to be trusted, there was not a class, married or unmarried, clergy or laity, from the Holy Father Leo X to the beggar by the wayside, free of it." "To so great an extent had these immoralities gone, that it was openly asserted that there were one hundred thousand women in England (when the total population was only five million) made dissolute by the clergy; and it was well known that brothels were kept in London for their use." * * *

Crowding.—As wars were constant, armies, which have always proved to be the crowds best adapted for diffusing epidemics, were ever in motion. "Cities were crowded fortresses, narrowly built, kept in a filthy state, and surrounded with stagnant ditches." * * *

An historian teaches that, for the common people, the only physician was the monk with his crucifix, and that the only sanitary provisions were the *paternoster* and the *ave*. * * * Macaulay says that the difference between London in the seventeenth and in the nineteenth century "is very far greater than between London in an ordinary season and London in the cholera."

In the middle of the sixteenth century the average duration of life in London was twenty-five years, and the annual mortality about eighty per one thousand. It is probable that it then enjoyed, as it does at present, the distinction of being the first among large cities in sanitation, as well as in health and longevity of its citizens.

EPIDEMICS AND MORTALITY OF FORMER AGES.

In ancient times pestilential diseases were destructive to a degree unknown in modern days. According to Plutarch, the Assyrian army lost one hundred and eighty-five thousand men in one night, at the siege of Jerusalem. Herodotus relates that one hundred and fifty thousand of the army of Xerxes perished in a few days. The bubonic plague reigned

over Asia, northern Africa, and Europe, from the fourth century, retiring from eastern Turkey in Europe about 1840, and reappearing in the valley of the Volga for a brief visit since 1870.

In the middle of the fourteenth century, as the Black Death, it destroyed thirteen millions in China and twenty-five millions in Europe. In 1665 it is said to have carried off three thousand in one night in London.

Smallpox was carried to Mexico in 1520, and, according to Robertson, it destroyed three and a half millions of people within a few years. Brought to Iceland in 1707, sixteen thousand fell victims—more than one fourth of the population. Reaching Greenland in 1733, it almost depopulated the country. Within the territory of the United States this disease has almost completely swept off whole tribes of Indians. Now an epidemic, or even a single case of smallpox, means neglect of the known means of prevention.

The present generation has witnessed the terrors and ravages of cholera in Europe and America for the first time, and already sanitarians have learned how to control it, and have held it at bay in southern Europe for six years. In those countries where hygienic laws are better understood, the disease has not been permitted to enter.

DURATION OF LIFE AT DIFFERENT PERIODS.

In the time of Cæsar, the average expectation of life was eighteen years; in the third century, the average duration of life among the most favored class at Rome was thirty years; now it is fifty years.

The records of Geneva give the expectation of life as follows: In the thirteenth century, it was 14 years; in the sixteenth century, it was 21.21 years; in the seventeenth, 25.67 years; in the eighteenth, 33.62 years. From 1801 to 1833, the average was 39.69 years; from 1814 to 1833, 40.68 years. In the sixteenth century, 25.92 per cent of children died in their first year; in the nineteenth century, 15.12 per cent. In the sixteenth century, 61.11 per cent, and in the nineteenth century 33 per cent, died before attaining 20 years. In the former period, 3.08 per cent passed 70 years; in the latter, 17.94 per cent.

In London, the annual death rate averaged at different periods, as follows: 1681–1690, 42.1 per 1,000; 1746–55, 35.5 per 1,000; 1846–55, 24.9 per 1,000. In 1871, it was 22.6 per 1,000, and in 1888, 19. In France, the expectation of life has increased from 28 to 45 years within the last half century. In Sweden, from 1770 to 1790, the average death rate was 28.5 annually per 1,000, and the expectancy of life about 35 years; from 1880 to 1885, the figures were respectively 17.5 and 57.

COMPARISON OF DISEASE AND MORTALITY UNDER VARIOUS CONDITIONS AT THE PRESENT TIME.

The researches of Caspar, at Berlin, into the vitality of different classes showed survivors as follows, in one thousand of each:

	Prosperous Class.	The Poor.
Alive after five years	943	655
Alive after ten years	938	598
Alive after twenty years	866	566
Alive after thirty years	796	486
Alive after forty years	695	396
Alive after fifty years	557	283
Alive after sixty years	398	172
Alive after seventy years	235	65
Alive after eighty years	57	9

The average length of life of the former class was fifty years; of the latter, thirty-two years.

The subjoined table is copied from a recent abridgment of a sanitary work by Sir Edwin Chadwick, and includes the families of each class. It has reference to London in 1843, when the general death rate was twenty-four per one thousand:

	Gentry and Professional.	Tradesmen and Shopkeepers.	Artisans and Laborers.
Proportions, per cent, of deaths from epidemics to total deaths	6.5	20.6	22.2
Proportions of deaths of children under one year to births	1 to 10	1 to 6	1 to 4
Proportions, per cent, of deaths of children under ten years to total deaths	24.7	52.4	54.5
Mean age at death of all who have died	44 years.	23 years.	22 years.
Mean age at death of all who lived more than twenty-one years	61 years.	50 years.	49 years.

The immense advantage enjoyed by the first class is explained by better housing and purer air and water, rather than by superior medical attention when sick. The second class can employ competent physicians, but lack means and intelligence to secure ample and hygienic housing.

A more striking illustration is furnished by the same author, of systematic marine sanitation, in the shipment of emigrants to Australia. In the first voyages, from ignorance of sanitation, from overcrowding, from filth and bad ventilation, as many as a third of the passengers died and were buried at sea. Afterwards the contract with the shippers was changed, so that they were paid, not on the number of passengers embarked, but on those landed alive. The shippers then engaged officers of health, who were paid according to the proportion of those landed alive. The result was a lowering of the death rate to one half what it had been among the same classes of people when living ashore. It is a suitable problem for legislators to devise some plan whereby similar results might be obtained in the population at large.

The following table, constructed from the researches of Sir Edwin Chadwick, illustrates alike rural and urban residence, and various conditions of life. Though it was made about fifty years ago, the ratio between different classes and localities is now substantially the same:

AVERAGE AGE AT DEATH.

	Gentry and Professional.	Tradesmen and Farmers.	Artisans and Laborers.
Truro.....	40	33	28
Derby.....	49	38	21
Rutlandshire.....	52	41	38
Wiltshire.....	50	48	33
Leeds.....	45	27	19
Manchester.....	38	20	17
Liverpool.....	35	22	15
Bath.....	55	37	25

In Paris it has been found that one thousand persons in easy circumstances, between forty and fifty years of age, have an annual death rate of 8.3, while the same number of poor people have 18.7. In London there are some districts, inhabited by the wealthy classes, where the death rate is 11.3, against 38 in the slums. In Liverpool, among the upper class, 8 per cent died in the first year of life, against 19 per cent of the general population. The deaths from pulmonary consumption are nearly one fourth the entire number from all causes among the poor, against one eighteenth among the rich.

Of course, it is unfair to credit all this advantage in favor of those in easy circumstances to superior sanitary conditions, inasmuch as the same class enjoy a considerable advantage in medical attention when sick; but it must be admitted that those who are well fed, well clad, and well housed, are far less liable to contract disease than those exposed to constant hardships and deprivations.

While the death rate in the British Isles is three less per one thousand than in France, six less than in Germany, eight less than in Italy, and eleven less than in Austria, it is noteworthy that the agricultural production of Britain is about double what it is in those other countries. Sanitation, therefore, is associated with the other economic forces which build up national prosperity.

The disastrous effect of overcrowding in the habitations of the poor in large cities is illustrated by the mortality especially falling upon the earliest period. Of children under five years of age the death rate in New York has been one hundred and ten per one thousand, and the same in Chicago; in Cincinnati and Cleveland, fifty; in Boston, forty-six; San Francisco, about forty-five; New Orleans, about forty-four.

In the Southern States of the Union the death rate of the African race is nearly 50 per cent higher than that of white people. In New Orleans, where the comparative condition of the two races approximates as closely as anywhere, the relative mortality is given as follows:

YEAR.	RACE.	Mortality Per 1,000.
1886.....	White.....	23.59
1886.....	Colored.....	34.09
1887.....	White.....	22.36
1887.....	Colored.....	32.12
1888.....	White.....	22.90
1888.....	Colored.....	32.04
1889.....	White.....	21.27
1889.....	Colored.....	30.93

The city of Calcutta is a forcible example of what may be achieved by intelligent sanitation. Its site is in latitude $22^{\circ} 35'$, upon the east bank of the Hoogly, and was formerly a swamp reeking with miasm. By drainage, an ample supply of stored rain-water, and other hygienic measures, its death rate has been reduced to twenty-six per one thousand, as in 1888, though cholera is almost constantly present. In contrast we observe St. Petersburg, founded about the same time (1703), in latitude $59^{\circ} 56'$, and likewise planted in a marsh. It has the advantages of much higher latitude, and absence of cholera, but neglect of sanitation gives it an annual death rate of thirty-two per one thousand in 1882, while Madras, Alexandria, and Cairo, with more favorable sites than Calcutta, in a sanitary sense, gave respectively forty, thirty-eight, and fifty-one per one thousand.

A more striking contrast is afforded by the two cities, El Paso and Juarez (Paso del Norte), on opposite sides of the Rio Grande, and communicating by a tramway across the river. The population of El Paso consists of eight thousand and thirteen whites, six hundred and eighty negroes, and two thousand one hundred and fifteen Mexicans. Juarez has about the same population, nearly all Mexicans. In the period between October 1, 1889, and May 27, 1890, the total mortality of the former was ninety, including six from smallpox; that of the latter was two hundred and fourteen, including forty-eight from smallpox. Estimated rate of mortality annually for the former, 12.27 per one thousand; for the latter, 29.18. The total number of cases of smallpox during this time at El Paso was twenty-nine; all sent to the pesthouse, except a very few who paid watchmen for guarding their houses night and day. The number of cases of smallpox at Juarez is not known. El Paso has strict sanitary regulations, and for Health Officer Dr. W. M. Yandell, who does not practice curative medicine at all, but gives his whole time to sanitation. The city has the Waring separate-sewer system for nine tenths of the population, and householders are required to make connection with the sewers. They are flushed daily by the Field tank, and ventilated by four-inch pipes running to the top of buildings. The outfall is into the river below the city. The water supply is taken from the river about a mile above. Juarez has no waterworks, nor system of sewerage. There is a City Physician, and nominally vaccination is a pre-requisite for admission to the public schools; but I was informed that it was not enforced.

Elsewhere in this volume will be found an account of epidemic smallpox at Las Cruces and Mesilla, New Mexico, during the summer of 1890, and public funerals of the victims from the church. No record of their number; no rivalry there between the Virgin Mary and Hygeia; not even "An Altar to the Unknown God."

DISEASES CONTROLLED OR CONTROLLABLE BY SANITATION.

The following diseases, which once prevailed extensively throughout Asia, Europe, and America, may be considered as practically controlled. The plague and sweating sickness have entirely disappeared, except the former from limited portions of Asia. Typhus fever and scurvy have so nearly disappeared that their presence is evidence of culpable negligence. Isolation of lepers has nearly eradicated leprosy from Europe and America, but it lingers or reappears in localities where this simple

method of control is neglected. Where vaccination is made compulsory, and strictly enforced, smallpox is scarcely known, as in Germany, England and Scandinavia. Its prominence as a disease is directly in ratio with neglect of this protective measure. Erysipelas, typhoid and puerperal fevers, are rapidly yielding to the judicious use of disinfectants; cholera is excluded by quarantine, or its infection destroyed by heat and chemical agents; croup and diphtheria have been much diminished by isolation and destruction of their contagious products; cerebro-spinal meningitis and scarlatina, by isolation. The malarial fevers gradually diminish as drainage of the soil improves. The same measure has ameliorated tuberculosis, and disinfection of sputa promises much more. Like dealing with the dejections gives good results in intestinal fluxes. Cleanliness and disinfectants have greatly mitigated the severity of venereal complaints. In short, the whole brood of zymotic ailments are fast coming under the sway of preventive medicine.

WHAT IS PROPOSED, AND WHAT IS DONE, IN OTHER STATES.

The following is quoted from a lecture by Dr. C. A. Lindsley, Secretary of the Connecticut Board of Health:

The causes of, and the means of preventing, infectious diseases are as well known and as readily controlled as those of railroad dangers. * * * Railroad corporations are compelled to pay damages in good money to their unfortunate passengers for injuries received on their roads; and, for loss of life, a few thousand dollars to surviving relatives. * * * Whenever our State Legislatures get so far enlightened as to make communities responsible for the suffering of their fellow-citizens by infectious diseases, and compel payment to every sufferer from the public treasury, then public hygiene will receive the attention which its importance demands. * * * No act of the Legislature could so promptly and so surely put Connecticut in the fore front of all the States of the Union for its superior sanitary condition as the enactment of a law like the following: "Every legal resident in every town in Connecticut, who shall, while residing in the town, have either of the following diseases, to wit: yellow fever, cholera, smallpox, typhus fever, scarlet fever, or typhoid fever, shall be entitled to receive from the treasury of the town \$3 for each day that he is confined to his house by such sickness, or by order of the Board of Health of the town for the public safety. And, in the case of the death of such person from such diseases, \$25 shall be paid from the town treasury to defray the expenses of the funeral. Every person so afflicted shall be subject to such regulations and restrictions during his sickness as the Board of Health of the town shall determine to be necessary for the safety of other persons."

There is better reason for paying such victims of disease than there is for paying damages to people who slip on icy sidewalks and hurt themselves. The town treasuries would suffer for a time, but soon town Boards of Health would become an important department of town government. The members of such Boards would be more considerately appointed than at present. Sanitary engineering, in the way of sewers, aqueducts, drainage schemes, etc., would be going on all over the State, to save the expense of paying for so much sickness.

Dr. Lindsley's ideal sanitation is not likely to be realized in the nineteenth century, but the early part of the twentieth may witness its inauguration; meanwhile, we may rejoice in the progress made in Michigan, as testified by Prof. A. L. Clark, of the State University, in a recent address before a Sanitary Convention at Norristown, Pa. He remarks that fourteen States have the township health-system. In Michigan, the Common Council of every city and village and the Board of Supervisors of every township is made by law a Board of Health, and is required to have constantly a well-qualified physician as Health Officer, and to report his name to the State Board of Health. In 1889, nine tenths of the one thousand five hundred localities complied with the law. Now mark the result: In 1888, the average number of cases and deaths in each separate outbreak of diphtheria in Michigan was,

respectively, 15.50 and 2.38, where isolation and disinfection were neglected (*i. e.*, without sanitary protection); and 1.74 and .58, where both were practiced (by sanitary authority).

HUMANITY VERSUS PROPERTY.

It will be instructive to compare the regard which the authorities of San Francisco give to human life and to the buildings of the city, as proved by the relative amounts expended in the matter of protection. The losses by fire in the year 1888 were \$870,219. The amount appropriated for the Fire Department for the fiscal year 1888-9 was \$336,710 54, which is nearly 39 per cent of the value of property destroyed by fire.*

Allowing the annual loss of California from preventable diseases to be \$3,000,000, as before calculated, and the city's portion of the same to be one fourth, we find a loss of \$750,000, for which the city expends less than \$30,000 in prevention, or 4 per cent. The authorities, therefore, are about ten times as liberal in the protection of property as in the protection of life. But the authorities are not solely responsible for a preference which has always existed. They were chosen by and of the people, and represent the people's ideas on most subjects, including sanitation.

According to the American Almanac, the fire losses of the United States for 1881 were \$80,522,900, or about two thirds of the estimated loss from preventable diseases at that time; and the fire losses of California were then \$3,045,600, or about the same as the cost of preventable diseases. The newspaper press gives all the details of one set of disasters, and is almost silent touching the other.

WHAT CALIFORNIA NEEDS.

The great want is a higher appreciation of preventive medicine, and its pursuit by a larger number of physicians. The difficulty is, that want of appreciation of its importance by the general public gives opportunity to scarcely any for devoting all their time and energies to this special branch. No one whose living depends on the practice of curative medicine can safely withdraw from it and take the precarious tenure of public sanitary service, and so far there is no private field for preventive medicine. There are approximately two thousand five hundred medical practitioners in California, who earn annually, on an average, at least \$1,000 each, from the practice of preventive medicine, or \$2,500,000. Now, it has passed into an undisputed proverb, that an ounce of prevention is worth a pound of cure. If there be any truth in the saying, would it not be wise to expend on it one sixteenth, or some similar fraction, of California's loss through sanitary deficiencies? One sixteenth of \$3,000,000 is \$187,500. But what is the amount actually allowed throughout the State for prevention? The State Board of Health is limited by the Political Code to \$4,000, and the Legislature in 1887 appropriated \$10,000 to aid the Board in excluding contagious diseases from the State, most

* At present writing (July, 1890), there is a probability that private citizens will contribute a further sum of \$100,000 for the purchase of chemical apparatus and hose, on the ground that the Fire Department is deficient in these important appliances. But the newspapers say nothing of the deficiencies of the Health Department for preventing disease, though the wants of the City and County Hospital are prominently set forth.

of which is still unexpended. Its average expenditures therefore do not exceed \$5,000.

In San Francisco the ordinary expenditures of the Health Department for strictly sanitary purposes fall short of \$30,000 annually; in Los Angeles they are rather less than \$5,000; in Sacramento and Oakland we may suppose the same amount to be expended, in the absence of available figures. For the State the whole amount is probably less than \$60,000 annually, or about 5 cents *per capita* for the entire population, and less than one third of the estimated "ounce of prevention."

Sanitation is the youngest and least loved of the children of Medicine. Many are not yet convinced that the infant is worth raising to maturity, and would let it starve rather than have any expense with it. Monterey has a newly born Health Department, its viability conditioned on service of its Health Officer for the nominal salary of one dollar a month! This is one dollar better than the allowance to the Health Officer at Las Cruces, New Mexico, now in a helpless struggle with smallpox. But Monterey has made a beginning, and may, later on, allow that "the laborer is worthy of his hire." This is of equal force with the declaration, "To the poor the gospel is preached;" but observation proves that poor pay and poor preaching go together. The same must hold in sanitation. It costs study, and labor, and material, and its value is likely to have direct relation to cost, according to the general rule of supply and demand. What it has contributed to the general welfare, and what is still to be expected, has been here imperfectly shown. I do not apprehend that any one begrudges the cost so far, or denies that public wealth has gained in like measure with public health.

Let us now come to the conclusion of the matter: Shall the good work go onward, or backward? Is California content to be outstripped in any branch of public improvement by less wealthy communities, or rest with a public health service inferior in any respect to what exists in the oldest and most enlightened polities of the globe? Let the people and their chosen representatives answer by their acts.

DISPOSAL OF SEWAGE.

Written for the State Board of Health of California by RUDOLPH HERING, Civil and Sanitary Engineer of New York.

A complete system of sewerage should collect the foul waters from an inhabited territory and dispose of them in a satisfactory manner. The collection is accomplished by means of a certain arrangement or combination of pipes or sewers, and the disposal by means of some treatment leading to the purification of the water which has acted as a carrier for the matter removed during cleansing operations from the person, his clothing, and his habitation.

Most of the organic waste matter thus taken up by the water is so finely comminuted, if it is not actually in solution, or itself a liquid, that it is at once seized upon by swarms of bacteria, and finally decomposed into inert matter which is inoffensive or harmless to us. In serving as food for bacteria, however, it increases their prevalence in our midst. This fact would be beneficial if all of them confined their task to the annihilation of sewage. But there are certain bacteria which, if permitted, will also seize upon the living blood and tissues of higher organisms, producing cases of zymotic disease, a certain percentage of which terminate fatally.

It is therefore necessary for the health of the community to prevent decomposition of organic matter as much as possible, under circumstances which contribute to the spread of bacteria in our midst. For this reason the sewerage system should be designed, constructed, and operated so that the waste matter, from the time that it enters the pipes within the dwellings, should be carried swiftly, and with a minimum of opportunities for retention or deposit on the way, until it reaches a point where it can safely be purified. The engineering problem, so far as it concerns the sanitary features of the system, is thus determined.

The design should aim to cause the water to flow with a sufficient velocity, so that the heaviest of the ordinary matter will be carried in suspension to the point of disposal, and thus prevent deposit and consequent foulness within the sewer. There is a fixed relation between the velocity of the fluid and the matter which it will carry in suspension. Thus, sand will be carried along by a stream of water flowing with a speed of six inches per second, but be deposited if the velocity is less. Pebbles one inch in diameter are carried along by a flow of about two feet per second, and are deposited if the velocity becomes less. The sewers should, therefore, have a certain minimum inclination or fall. They should also have a sectional form which will concentrate the sewage laterally into a compact stream, instead of allowing it to be spread out in a thin sheet. All changes in the direction of the flow should be made in such a manner as to prevent eddies, or a material reduction of the velocity. The interior surface of the sewer upon which the sewage flows should be as smooth as it is practicable to make it, because roughness causes particles to be held back. It would likewise be desirable,

but engineering science has not yet solved the problem, to prevent a smooth surface from allowing the adhesion of mycelial and other growths, forming a slimy surface, and thereby again causing the adhesion of passing matter.

In spite of the greatest care in building and in maintenance, some decomposition will always occur in sewers, and we must, therefore, provide for cleansing, both by ventilation, to dilute and remove offensive gases, and by flushing, to produce an increase of the ordinary amount of velocity of the water, and thereby cause it to again take up and remove matter which has been deposited. Ventilation is usually obtained by facilitating the natural circulation of the air within the sewers. This circulation is caused by a difference of temperature and of humidity within and without the sewers, and under certain conditions by impulsion, due to the flow of the water. Artificial ventilation has rarely been a success, owing to the necessary complication in the arrangement of the pipes within the houses and in the streets. Flushing is usually obtained by causing the sewer to run more than half full for a short period of time, either by temporarily damming the sewage, or by suddenly introducing other water in large quantities.

This first part of the problem, namely, the collection of sewage, is comparatively simple, but the second part, pertaining to the final treatment with reference to purification, is far less so. It has been the subject of much controversy and of many experiments. Until recently, when bacteriology had sufficiently developed to throw some light upon the matter, the discussions were generally unscientific, based upon assumptions rather than facts, and often guided by self-interest, with consequent misrepresentations of facts.

For a long time the principal efforts were directed toward converting sewage into manure. It was thought that, besides being a satisfactory solution of the sewage question, great profits could be made from such a conversion. In Europe "dry removal" of the nightsoil or solid matters was frequently urged. This allowed manure to be manufactured from sewage at a smaller cost than if the solid matter were combined with the wash water from kitchens, laundries, bed-rooms, etc. But this water was still left unprovided for, and formed sewage about as offensive as when it contained the more solid matter. A good example of this may be seen in Paris, where most of the excrementitious matter was, and, I think, still is, separately collected and disposed of as manure, but where the sewage in the sewers is so foul that the river Seine, below the outfalls, is made black in color and offensive to smell. England, which has generally been in the lead in sewerage matters, has only a few localities retaining the system of dry removal. But in every such case it still leaves unsolved the purification of the large amount of dirty waste water which is discharged from the buildings of a modern city well supplied with water, and which virtually makes up the sewage thereof.

The quantity of sewage which it is necessary to deal with is approximately measured by the quantity of pure water supplied to the inhabitants. Gaugings have shown that the two correspond closely. Sometimes the natural soil is very wet, and when drained into the sewers increases the quantity of sewage. Elsewhere the ground may be dry, the rainfall scanty, and much of the water supply used for sprinkling, which diminishes the quantity of sewage; but on an average the relation

is nearly constant, and furnishes a good measure for projected schemes of sewage purification.

In European cities the water consumption ranges from twenty to fifty United States gallons per day per head of population, and in American cities from fifty to one hundred and fifty gallons. The greater figures for our own country are due partly to a more liberal use of water and partly to the waste caused by a lack of restrictive measures. While we may in the future prevent much of this waste, we will hardly curtail, to any great extent, the amount of water supplied, as in a modern community the legitimate uses for it are continually increasing in number. In comparing the results of sewage purification in Europe with those of our own country, we must therefore not forget the relative quantities of sewage which have to be dealt with.

Probably the oldest method of disposing of the waste waters, though imperfect in detail, was the application to land, or simple irrigation. In Italy and Spain, and some parts of Germany and France, more or less crude methods were occasionally practiced. The object of irrigation was profit rather than sewage purification, and therefore the requirements for the latter were left substantially undeveloped.

Toward the middle of the present century, when cities began their modern rapid growth, the question of purification of sewage forced itself upon the communities. This was particularly the case in England, where many towns, using rivers as sources of water supply, also used them as the most convenient depositories for their waste water, to the detriment of the towns below.

Broad irrigation was recommended and applied with more or less success. The leading idea was to have vegetation absorb, and thus to dispose of the sewage as it was delivered upon the fields. One acre was considered necessary for the sewage from about one hundred to two hundred persons. But not everywhere was suitable or sufficient territory to be had, and seldom was this method of disposal found to pay the cost of properly applying the sewage to the land.

It was then suggested in England that in porous soil sewage could be purified by filtration, and would require much less territory, namely, one acre of land might serve for from six hundred to one thousand persons, according to the porosity of the soil. This method was found to be successful in purifying sewage when the ground was carefully prepared in level beds and furrows, and underdrained, and when the application was intermittent.

Where no porous ground was obtainable, or where its preparation was too costly, filtration was not feasible, and still other methods of purification had to be sought. It was known that milk of lime, salts of iron, and other chemical agents, would coagulate some of the albuminous compounds, precipitate organic matter, and thus clarify the liquid. The deposited "sludge" could then be treated as manure. A multitude of processes for precipitation were patented, and some were practically tried. The general results in brief were these: The clarified liquid was still more or less impure, and soon putrefied if left standing. If discharged into a river, however, and diluted with fresh water the discharge was not objectionable. The deposited matter, or "sludge," was, however, rarely of sufficient value as a manure to justify the expense of drying and preparing it for the market. Owing to the cost of the

chemicals and of handling the sewage, the cost of precipitation was often prohibitory.

In the meantime, those cities which were situated upon large rivers or on the coast, disregarded all methods of land and chemical treatment, and turned the crude sewage directly into the passing currents of water, generally because it obviated the cost of providing special works for purification.

Each of the three above mentioned methods of sewage disposal began to have its advocates, and we can find a voluminous literature setting forth the advantages peculiar to each. An impartial observer examining the various executed works for sewage disposal would come to about the following conclusions:

Each one of the above methods has merits, and is capable of accomplishing the desired object under favorable conditions. A preference of one over the other should rest upon the desired degree of purity and upon the relative cost. Where a direct discharge into a large river or into the sea is not objectionable, it will generally be the least expensive method of disposal. Where such a discharge is impracticable, either a partial or a complete purification can be obtained by straining the sewage through screens, which will prevent floating matter from stranding upon the shores or in shallow places. A much better partial purification is obtained by collecting the sewage in tanks and treating it with precipitants. The effluent water in this case can be made clear and discharged into a stream or along the ocean beach with impunity. Where the stream is to be thereafter used for a water supply the effluent from precipitation works is usually unsatisfactory, unless it can afterwards be subjected to land filtration.

Filtration through land unquestionably accomplishes a greater degree of purification than can be obtained by any other method of treatment. If the conditions are favorable, the soil suitable, and the management good, the purification can be made complete, and the effluent safely be discharged into any stream furnishing potable water.

While existing sewage works, if carefully compared, lead the observer towards these conclusions, we are now, through our recently acquired knowledge of the bacterial action upon sewage, also able to explain them, at least partially.

A jar of fresh sewage if left standing in a warm room soon becomes putrid. The number of bacteria increases until a maximum is reached, after which the water assumes a clear color, and a sediment forms on the bottom. After a sufficient time the main body of water is practically free from putrescible organic matter and bacteria, and contains in solution but the gases, which are the products of decomposition. This purification is hastened by warmth and aeration, and it is retarded or prevented by cold and lack of oxygen—conditions which are respectively favorable and unfavorable to the development of germ life.

If sewage is sterilized by boiling or otherwise, and retained in this condition, no purification takes place. It is therefore necessary, first, to provide conditions which are favorable to the life and action of bacteria upon the sewage; and, secondly, to prevent the resulting decomposition from being offensive, through an absorption of the gases, either by large bodies of water or by the soil. With these requirements as a basis we can arrive at some practical results.

The discharge of sewage into large bodies of water will not be objec-

tionable if the dilution is great enough to supply the required oxygen, and to absorb all the gases of decomposition. When the temperature of the water is high, bacterial action is more rapid and the dilution required greater than when the water is cold. This fact is demonstrated by comparing the condition of streams or lakes receiving sewage in southern with those in northern latitudes. A warm current will, therefore, show a complete purification to have taken place earlier along its course than a cold one in which bacterial action is retarded; instance the summer and winter conditions of the canal and the Desplaines River, which receive the sewage of Chicago, and where the polluted condition can be traced much farther down stream in winter than in summer.

Further, as salt water is not favorable to the life of bacteria, purification is slower, and sewage remains therein in a decomposing condition for a longer time than if the water is fresh. Coves and bays receiving sewage are, therefore, apt to become foul sooner in salt than in fresh water. Therefore, again, if a constant current could be obtained to dilute the sewage and to carry it away, less water would no doubt accomplish the object satisfactorily in salt than in fresh water. Unfortunately, we have very few precise measurements referring to this matter, and even if we had many, the conditions are generally so different that they seldom permit a direct comparison. We must depend upon results derived from experiments on a small scale and from general comparisons, and for the present be content to draw our fundamental conclusions only from relative instead of absolute data.

Sufficient experience has been gained, however, concerning the latter, to obtain some approximate figures for the amount of sewage dilution required to prevent objectionable conditions. In a paper read before the American Public Health Association (Vol. XIII of Trans.) I have collected some fragmentary data on the subject, reduced them to a common measure, and indicated the inferences to be drawn. It is there said:

The first point to settle is a proper measure for the permissible pollution. This is best assumed as being the quantity of water which can safely receive the drainage from a unit of population; in other words, the least number of cubic feet of water per minute which should flow down the stream for say one thousand persons draining into the same. By using this measure we eliminate the difficulties arising from a varying quantity of water consumption and dilution of sewage before reaching the stream.

The problem then is, how much running water must we have to dilute the sewage from every one thousand persons in order to make it inoffensive, not objectionable to manufacturing interests, nor destructive to fish?

The standard for inoffensiveness must of necessity be one of personal judgment, and can only be approximate. The admissible sewage pollution of water used for manufacturing purposes depends on the particular industry, some mills require a much higher standard than others; and, unless in any particular case the nature of the industry is a governing element, we are again obliged to resort to personal judgment as to what is a fairly clean water for average cases. A standard of pollution which, thirdly, will prevent the destruction of fish depends upon the particular species which it is desired to retain. Yet, as we find fish living in sewage-polluted water which is sufficiently diluted to answer the first and second requirements, we can usually ignore this one, except in occasional instances, where it assumes special importance, and where special experiments will become necessary.

After stating the manner in which practical results could be obtained from existing information and describing the instances in America and Europe where approximate measurements had been made, it is said:

By comparing those results, and also those of the other rivers mentioned, we can observe much similarity and consistency, and, for the present, we may draw the following inference: Rivers not to be used for water supplies, but to be inoffensive to communities residing a few miles below, to remain fit for ordinary manufacturing purposes, and to sustain the life of fish, may receive the sewage from one thousand persons for at least one hundred and fifty to two hundred cubic feet of minimum flow per minute, supposing that natural

subsidence of the heavier matter takes place immediately below the town discharging the sewage.

Beyond the above limit it appears to be advisable, when arranging for a sewage disposal, to resort to its purification at once by land or other filtration, or by chemical precipitation, in order to prevent the river water from becoming objectionable to others.

While the above figures may be a useful guide in many instances, yet they are but empirical formulæ, to be used only by those who thoroughly understand the subject, and to be applied only in cases similar to those from which they were deduced.

We are more fortunate in the way of exact data regarding the purification of sewage by land filtration. The Massachusetts State Board of Health has, for several years, been engaged in experimenting on this subject at Lawrence, Mass., where a station has been erected for the purpose. In the nineteenth annual report (1888) it is said, in regard to areas that may be selected for filtration, that, at present, no one can tell the character of the effluent water that will result from the application of sewage in large or small quantities, nor the effect of our winters and of long storms upon the efficiency of the soil, nor the proper intervals for application. This knowledge could only be obtained by trial and careful observation. An appropriation was therefore secured and the necessary experiments made. They at present still continue and results are being reached, which, for the first time, place the entire subject of sewage filtration upon a scientific basis.

The filtering grounds comprise about two thirds of an acre. Upon them are ten tanks, circular in plan, about seventeen feet in diameter, and allowing for material to be filled in five feet deep. From the lowest point in the bottom of each tank a two-inch pipe conveys the drainage to a flume within a building, whence the effluent is taken for analysis and examination.

The tanks were filled with different materials, as follows: No. 1, very coarse, clean mortar sand; No. 2, very fine, nearly white sand; No. 3, peat; No. 4, river silt; No. 5, brown garden soil, well manured; Nos. 6, 7, and 8 were filled with three feet eight inches of coarse and fine sand, ten inches of yellow sandy loam, and six inches of brown soil; No. 9, very compact, sandy, hardpan of clay, sand, and gravel, covered with nine inches of brown soil. No. 10 was used to measure the rainfall and evaporation. The sewage used in the experiments was taken from a main sewer draining a portion of the city. Apparatus were erected for measuring the sewage and the effluent, and biological and chemical analyses of both were made daily. The sewage was applied intermittently at intervals of one or more days, and disappeared from the surface in a few minutes or hours.

From the last report of the Board we gather the following statements regarding the general results which were so far obtained:

Sewage can be much more efficiently filtered through open sand than through sand covered with soil. Very fine material, like dust, in the upper layers of a filter, prevents free access of air, and when wet, may exclude air so completely as to render purification impossible. With soil or sand containing dust at the surface, periods of intermission in the application of sewage may be made so long that the surface, becoming dry, may allow air to enter, and a high degree of purification may result; but the quantity of sewage that can thus be purified is very much less than when the upper layers of the filter are composed of open sand, through which the sewage will rapidly disappear, and will leave room for air to enter and come in contact with the thin laminae of liquid covering the particles of sand.

Filtering areas of sand covered with soil, or areas of very fine sand, may be much increased in efficiency, in both summer and winter, by digging trenches in the direction of a slight incline, about two feet deep, and one foot wide, and six feet apart, and filling them with coarse sand. The sewage should be applied to this coarse sand, and once in a month or two, a half inch in depth should be taken from its surface and replaced by clean sand.

A very few vegetable organisms that can be identified by the microscope have been found to occasionally pass through the coarser filters; but in general none come through.

Of the still more minute organisms, the bacteria, we found that soon after sewage was first applied to the tanks they came through in great numbers, but became reduced in number, and during the later winter and spring months amounted to 2 per cent and less of those of the applied sewage; but after nitrification commenced they decreased rapidly, and continued through the summer, in many cases, less than one hundred, and, in some, less than ten, while the number in the same quantity of applied sewage was about a million.

The experiments made to the present time show that the number of bacteria in the sand decrease very rapidly from the surface downward. In the finer sands they nearly or quite disappear before the bottom is reached. Experiments are in progress to prove whether any live to come through the finer sands with the effluent; but they have already shown that through the very coarse sands they are brought with the effluent in very small numbers, with the ordinary rate of flow from the sewage tanks, and that when the rapidity of flow is the highest, the number of bacteria in the effluent has reached as high as 2 per cent of the number in the applied sewage.

In some of the tanks it appears, that of the large number of species found in the sewage, a single species only lives to reach the outlet.

We have reason to hope that the filters may be so made and managed that all disease germs may be, with certainty, removed, and think this important subject should be pursued to definite conclusions.

The tanks, which were filled with clean, coarse mortar sand, received sewage at the rate of thirty thousand, sixty thousand, and one hundred and twenty thousand gallons per day. Until nitrification commenced—after periods of forty-one, thirty-one, and twenty-seven days, respectively—97, 94, and 80 per cent of the impurities of the sewage were removed. When nitrification reached its height, the ammonias were reduced to 1 and $1\frac{1}{2}$ per cent of those of the sewage.

The rapidity of purification, as shown by the decrease in ammonias, was greatest in the tanks which had received the most sewage, and had the greatest amount of nitrogenous matter stored in them, the effluent from the sand which had received the least sewage being more than a month later in reaching its condition of greatest purification.

The filter receiving sewage at the rate of one hundred and twenty thousand gallons per acre per day gave an effluent for three months after purification, resulting from nitrification, was established, in which the ammonias were less than $1\frac{1}{2}$ per cent of those of the sewage. Upon increasing the amount filtered to one hundred and eighty thousand gallons per acre per day, the ammonias increased, but for the next four months averaged less than 2 per cent of those of the sewage.

The filter receiving sewage at the rate of sixty thousand gallons per acre per day for seven months after purification was established, gave an effluent of nearly constant quality, having one half of 1 per cent of the ammonias of the sewage, the free ammonia averaging 0.0012 parts, and the albuminoid ammonia 0.0015 parts in one hundred thousand parts, showing less organic matter than many of the drinking waters of the State.

Experiments were made to ascertain the different effects of continuous and intermittent filtration. "In intermittent filtration the nitrification was active, and, as shown by the ammonias, 99 per cent of the organic impurities were removed; while in continuous filtration the nitrification ceased, and the same sand, filtering the same quantity of sewage, stored impurities for a time, but poured out an effluent quite as impure as the applied sewage."

Fine sand was found to make the best filter, and could purify the sewage to a higher degree at the rate of twelve thousand gallons per acre per day, so that the number of bacteria in a cubic centimeter was reduced from five hundred and ninety-one thousand to two, and the ammonias to one fourth per cent of that of the sewage.

Garden soil was found to make a very poor filter or purifier. After applying only ten thousand gallons per acre per day for eight months, the effluent was "more impure than the applied sewage." The bacteria numbered one hundred and nine, while in the sewage they numbered two hundred thousand.

A mixture of coarse and fine sand and gravel filtered sewage very satisfactorily at the rate of twenty-five thousand gallons per day in the winter, and forty-two thousand gallons per day in the summer. The bacteria of the effluent numbered fourteen, while those of the sewage numbered three hundred and fifty thousand.

Peat was found to be entirely inefficient as a purifier, the ammonias in the effluent being equal to those in the sewage.

The filter containing loam and sand gave an effluent very nearly as pure as that from the sand and gravel alone, but the quantity of sewage which could be filtered was only one third as great.

A report giving a very full description of the details of the investigation and further conclusions will soon be issued, and will form a most valuable contribution to the knowledge of the world upon the subject of sewage disposal. While much of the information applies to a climate which for several months is both damp and cold, many of the results will be equally valuable for the climate of California.

The land disposal of sewage is a question which will be of peculiar interest to the citizens of your State, as irrigation during the dry season is of vital importance, and water at that time assumes a high value. Besides accomplishing a sanitary benefit, it may therefore also be made remunerative from a financial point, which cannot generally be said of such works in the Eastern States, and you may expect to find this method of sewage disposal a favorite one. However, to make sewage farms pay a profit should always be a secondary consideration, the sanitary question being held uppermost.

Regarding the often expressed fear that sewage farms create a nuisance and injure the value of neighboring property, I quote the following paragraphs from a report upon the disposal of the sewage of Los Angeles City, made in December, 1889:

Sewage farms need not cause any nuisance. Some smell may be noticeable at the ditches towards evening when the air is damp, and on muggy days. It may particularly be the case when the sewage is not delivered fresh.

There is no well authenticated case where sewage farms have caused sickness. In England, people reside on lands adjoining them. In Paris and Berlin new villages have sprung into existence since the sewage has been used for irrigation, and the death rate is recorded as being little over one half of that of the respective cities.

In order to have a minimum amount of odor, it is necessary to convey the sewage in open, artificial, and smooth channels or carriers, and allow it to run in earth ditches only for temporary purposes; and where it immediately filters away, these ditches should be frequently raked over to be kept clean and pure.

Those who have inspected the successful sewage farms in Europe and America can bear testimony to their freedom from nuisance, when proper care is taken with the distribution of sewage and the ditches. This care simply consists of faithful attention. It is neither irksome nor expensive, and is capable of being secured by appropriate legislation.

From what has been stated in these pages it can be seen that by means of the advances of bacteriology the question of sewage disposal has emerged from the realm of doubt, and by assuming a position which allows an intelligent and rational perception of some of the main requirements necessary for its solution, has become a science. Although much still remains to be accomplished, the engineers of to-day are in a better position than formerly to solve the question, and avoid the risk of failure.

NEW YORK, September, 1890.

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